THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | MARCH 18, 1985 | VOL. XIX, NO. 11

Check this
Yates Ventures evaluates Conetic Systems' Higgins/11

Family tree
The legend of NCR/66

In Depth
Engineering expert systems
Follows 62

IBM policy draws fire

Users say source code rules hamper change

By John Gallant
CW Staff

While IBM's policy of withholding source code for selected software products has already marked its second anniversary, users are only now beginning to cope with the impact of that decision. But whether or not the advent of object-code-only products has affected their day-to-day DP operations, some users remain angry about IBM's decision.

Announced in February 1983, IBM's object-code-only policy has been applied to a growing list of Big Blue systems software products — some of which are just now being installed at user sites [CW, Feb. 25]. The announcement declared that for certain new products and upgraded releases of existing products, source materials would be released on a limited basis or not at all.

IBM said the source code restrictions were intended to serve two purposes: to protect its proprietary programming investment and technology from other manufacturers, notably the Japanese; and to alleviate problems that arose during the installation of enhanced versions of its packages at sites where major modifications had been made to systems software.

For months following IBM's decision to change its long-held policy of making source materials generally

See FIRE page 6

Growth of networks seen boosting allure of micros

By Eric Bender
CW Staff

At a baby food factory that Bristol-Myers Co. opened recently in the Netherlands, a personal computer local-area network handles receiving, purchasing, inventory, stock location, customer information and a host of other manufacturing resource planning tasks. "It's a production system," noted Roy Post, project leader for the installation. "The plant can't run without it."

Another micro network runs spreadsheets, word processing and electronic mail programs at a giant Celanese Corp. polyester fibers manufacturing facility in Salisbury, N.C. Fifty micros — separated by up to a quarter of a mile in the 2½ million-square-foot plant — may be on the net by the end of the year, according to Matt Mengel, network coordinator at Celanese.

In a high-rise office building in Cambridge, Mass., software vendor Index Technology Corp. is switching its development efforts away from a Digital Equipment Corp. VAX supermini

See NETS page 17

Last week's Product Spotlight highlighted the technology of microcomputer local-area networks. This week, Computerworld turns to user experiences and expectations.

NAS unwraps AS/XL family of mainframes

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Citing an ever-increasing demand for higher throughput, National Advanced Systems Corp. last week rolled out two mainframes designed to compete with the Sierra series IBM announced last month.

Anchoring the company's IBM-compatible AS/XL series is the Model 60, a uniprocessor operating at 28 million instructions per second that reportedly equals the performance of Big Blue's dyadic 3090 Model 200 [CW, Feb. 18].

The AS/XL line also includes a dyadic CPU, the Model 80, that delivers roughly the same computing horsepower as the 3090 family's four-processor Model 400, according to Mitch Schoch, NAS' systems marketing director.

NAS said it will ship both AS/XL machines in the second quarter of 1986 — six months later than the reported shipment date of IBM's Model 200 but a year ahead of IBM's reported shipment date of its larger Model 400.

Both the AS/XL Models 60 and 80 cost 20% less than their Sierra counterparts and require about a third of the floor space, Schoch said. The reduced footprint is attributed to the AS/XL family's emitter-coupled logic chips, which are reportedly 3½ times denser than the corresponding ECL circuitry in the IBM 3090 series.

In an unprecedented move, NAS timed the AS/XL's debut to coincide with a similar introduction by the company's hardware supplier, Hitachi Ltd. In the past, Hitachi's announcements for the domestic Japanese market have usually preceded its U.S. business partner's product moves by six to nine months, according to Doug Bailey, NAS' vice-president of worldwide marketing. Hitachi quoted a fourth-quarter 1985 delivery date for its systems.

The AS/XL Models 60 and 80 correspond, respectively, to Hitachi's M-680H uniprocessor and M-682H dyadic mainframe, which were announced

See NAS page 9

TOP OF THE NEWS

A federal agency has moved to suspend Paradyne from contracting with the U.S. government after allegations of poor performance on a $118 million Social Security Administration contract. Page 2.

■

Running out of steam. Major computer vendors and semiconductor companies continue to report weak sales and profits. Page 6.

■

Has DP walled itself off from the corporate mainstream? One consultant thinks so, saying that DP is now paying the price for its isolation. Page 12.

■

To err is human. The IRS blamed improper tape handling, not computer error, for a snafu that resulted in mailing 26,000 faulty delinquency notices. Page 15.

FYI

DP retrofit keeps Schwinn wheeling toward recovery

By Maura McEnaney
CW Staff

CHICAGO — Water stains are yellowing the raised white floor at Schwinn Bicycle Co.'s computer room, where a plastic cover shields a shelf of newly installed modems. In the hallways of the sprawling brick building in northwest Chicago, stray wastebaskets catch the water dripping from the leaky roof. Downstairs, cars are parked on the factory floor, where machines and bustling workers once hammered out parts for the Schwinn bicycle line.

Schwinn Bicycle Co.'s less-than-glamorous headquarters

Schwinn's somewhat dismal facility is not a pressing concern for MIS manager Robert Walsh, who over the past five years, has been working to bring DP technology up to speed at the 90-year-old bicycle company.

See SCHWINN page 4

NEWS

Arizona charges DEC with rigging bids

By Edward Warner
CW Staff

PHOENIX — The Arizona State Attorney General's office has filed twin antitrust suits against Digital Equipment Corp., alleging that DEC rigged the bidding for a 1983 equipment contract that the Pima, Ariz., county government solicited.

The nearly identical complaints, both filed in Maricopa County Superior Court here on March 8, claim that DEC "contacted and persuaded or coerced its OEM dealers not to submit bids for RFP [request for proposals] 570," an RFP under which the county planned to buy computer equipment.

In addition, the two suits charge that DEC "persuaded or coerced Computer Systems/BFA, a Scottsdale, Ariz., OEM of DEC equipment, into withdrawing its bid after Computer Systems/BFA won the bid for RFP 570."

DEC spokesman Jeffry Gibson responded to the suits by saying that Computer Systems/BFA should not have bid on RFP 570, which he said was a request by the Pima County Sheriff's office to purchase eight DEC Decmate II word processing systems. DEC, according to Gibson, "pointed out that [Computer Systems/BFA] would be violating our OEM contract if [it bids] because there was no added value."

DEC to defend itself 'vigorously'

Gibson maintained that DEC does not believe it has violated the Arizona antitrust law and warned that "we intend to vigorously defend ourselves." He said DEC views the suits as a "dispute over $4,000," the difference, he said, between DEC's bid of $52,296.60 and the bid offered by Computer Systems/BFA.

Computer Systems/BFA President George Aeed said he was unaware that the suit had been filed and denied that DEC had coerced his company into withdrawing its bid. "No, of course not," he said, "DEC doesn't ask us to conspire with them."

Assistant Arizona Attorney General Gary P. Brady, meanwhile, said that DEC and Computer Systems/BFA were the only two vendors to submit bids on RFP 570 by the close of bidding on Aug. 16, 1984.

No choice but to accept DEC bid

When Computer Systems/BFA pulled out, he claimed, Pima County was left with no choice but to accept DEC's bid.

One of the suits was filed by the Attorney General's office on behalf of Pima County, the county in which the city of Tucson is located. That suit asks that DEC be required to either pay the county's cost of having allegedly had to accept a noncompetitive bid or pay the county 30% of the contract's price.

The other suit was undertaken by the state, an option, Brady said, that the state may take in any antitrust action. The state's suit asks that a $150,000 penalty be assessed against DEC.

Both suits ask that DEC be ordered to cease "continuing, maintaining or renewing the combination and conspiracy" that the state claims led to the rigging of the Pima County bid.

Brady, who filed the suits for the attorney general's office, said that the state had the option to bring either a civil suit or a criminal charge against DEC under the state's antitrust law. He refused to say why a civil suit was chosen.

Pima County Purchasing Director William Cox declined to specify the type of computer equipment involved in RFP 570 or how the county learned of the alleged bid rigging.

U.S. agency asks ban on Paradyne pacts

Registers terminal performance glitches

WASHINGTON, D.C. — The U.S. Department of Health and Human Services last week proposed to suspend Paradyne Corp. of Largo, Fla., from contracting with the federal government. The action followed a task force determination that the company "had substantially misrepresented the status and availability" of data communications equipment to fulfill a contract with the Social Security Administration (SSA) worth $118 million [CW, April 4, 1983].

Paradyne immediately denied the charges, saying it was meeting the terms of the contract, and it vowed to fight the proposed suspension, which would last for three years if it were to take effect.

Under the suspension procedures, Paradyne has 30 days to contest the proposed suspension by submitting evidence refuting the claims in the task force report on the company's performance.

SSA officials said that while technically the company was in compliance with the contract, the incidences of performance problems were greater than expected and that the work of the agency was being affected.

Last year, congressional hearings focused on the alleged difficulties that the SSA was having with the performance of terminals supplied to its field offices by Paradyne.

A report issued last year by the House of Representatives Government Operations Committee found that the performance of the terminals had a "detrimental impact" on the agency, and the committee recommended that the company be suspended from renewing the contract, which expires this year.

A U.S. General Accounting Office (GAO) report last year stated that the Paradyne terminals were not functioning as called for in the initial contract. The GAO added that despite the introduction of Paradyne equipment, SSA processing methods had not been upgraded as originally intended. According to the SSA, most of the equipment installed under the contract is operating satisfactorily, and it said that it would not remove the equipment if the proposed debarment takes effect.

However, the SSA said that it plans "[the] replacement of Paradyne equipment, [which] will take place over the coming years . . . to ensure benefits from the advances in data processing technology."

Paradyne has installed most of the 1,800 terminals as called for in the 1981 contract in 1,300 SSA offices across the country.

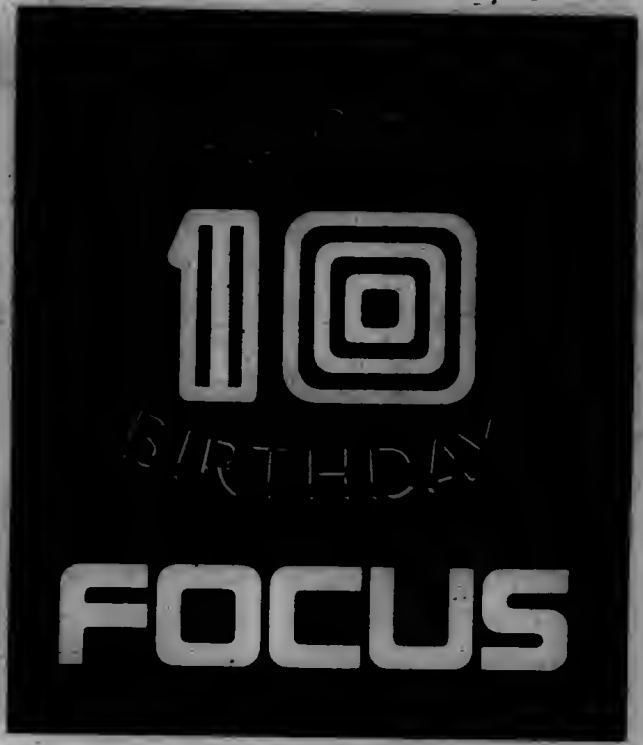
NEWS SUMMARY

CORRECTIONS

The network control, integration and printer optimization products announced recently by Comm+ Systems, Inc., a subsidiary of Pacific Northwest Bell Telephone Co. headquartered in Seattle, are available now.

Additionally, the Printed Output Management System is actually capable of routing a message to, and not just addressing, any of 256 printers at one time.

Because of incorrect information supplied by the vendor, a story about Martin Marietta Data Systems, Inc.'s Orlando 4000 time-sharing service [CW, March 11, 1985] said the service includes the firm's micro software. While the Orlando 4000 service can use Martin Marietta's micro software packages, they are not included in the basic price of the Orlando 4000 service.



Thanks to the industry's leading 4GL/DBMS for 10 years of superior product enhancements and reliable service, from the 160,000 users of FOCUS worldwide, and FUSE, the Focus Users Group.

fuse inc.
THE FOCUS USERS GROUP

To learn how FOCUS technology can significantly improve productivity within your corporation, write to Donald Wszolek, Dept. F2, Information Builders Inc., 1250 Broadway, New York, NY 10001.

INFORMATION BUILDERS, INC.

New York: (212) 736-4433 • Washington, D.C.: (703) 276-9006
Chicago (312) 789-0515 • St. Louis: (314) 434-7500
Dallas: (214) 659-9890 • San Jose: (408) 293-6600
Los Angeles: (213) 615-0735 • Houston: (713) 952-0260

Schwinn CEO geared up to meet overdue DP needs

Schwinn CW photo by M. McEnaney

By Maura McEnaney
CW Staff

CHICAGO — Convincing top management of computer needs is often an obstacle for MIS managers. But at Schwinn Bicycle Co., little convincing was needed.

"I went to college," said 36-year-old Edward Schwinn, president of the $150 million bicycle company. "If I were 50, I might have a roadblock or two in my mind, but I don't. I used computers to get me out of college."

Schwinn said he was a driving force in the company's automation process. He said he attempted to ease automation fears by working on a terminal within clear view of all who enter the company's headquarters based here.

"We felt quite seriously that if we were going to be competitive in the 1980s and 1990s, [then] we had to support our information systems across the entire country," Schwinn said in a recent interview.

'Our business . . . is bicycles, parts and service'

He added, "Our business is not computers; it's bicycles and parts and service. But we feel very strongly that computers can aid in that and make our life easier all the way around. Keeping track of literally thousands of line items, everything from nuts and bolts to fully completed bicycles, is no easy task, and we did it on a fairly helter-skelter basis before."

Even justifying escalating MIS budgets to the board of directors during times of near-financial crisis was not a problem for Schwinn. "My family owns this company, so it's not necessarily a question of going to your board of directors and pleading for something. Oftentimes it's spoken of around the dinner table, and we go ahead and do it."

From such conversations come rapid decisions on buying equipment like the IBM 5080 series graphics processing system now installed in Schwinn's engineering department. The IBM system is used largely at Schwinn for computer-aided design and manufacturing.

'We're incorporating the tools that best fit our objective'

"In an organization of this size, you could spend a lifetime justifying it," Schwinn said. "You're wasting a lot of time doing a lot of analytical work, when you know you ought to go forward and develop the product and the expertise of the brainpower that you've got in engineering. All we're doing is incorporating the tools that best suit our objective."

He said that expensive tools, such as Software AG of North America, Inc.'s Natural language, are never purchased before Schwinn has heard a presentation on that product. "Nobody spends that kind of money around here without me knowing about it," he said. "But if you get enough guys to stick their hands up and say 'it's gonna work, chief,' you'd be surprised what a motivator that is," he added.

According to Schwinn, "We were very blessed by being an antiquated computer user. . . . We started from ground next to zero, and we brought more tools and more skills and more equipment and more software to the people who are using them. And people are using them at a ferocious rate. They've all of a sudden discovered they don't have to work as hard anymore."

SCHWINN from page 1

Today Walsh oversees a $1.9 million annual DP budget, a far cry from the situation he encountered when he joined the company in 1980. Like many established U.S. companies, in the late '70s Schwinn found itself plagued with manufacturing, distribution and inventory problems; at the same time, Schwinn was being outdistanced by European manufacturers aggressively chasing the 10-speed bicycle market.

A management change in 1979 returned a Schwinn family member to the president's office and marked the beginning of a series of dramatic changes at the company.

Upon the recommendation of consultants Peat, Marwick, Mitchell & Co., Schwinn began retrofitting its computer department under Walsh's direction. Although an IBM 370/138 mainframe was on order, "I inherited the responsibility of getting the machine features correct, getting the computer room built and upgrading the system," Walsh said. Systems were so archaic, according to Walsh, that the department was still writing programs in assembler.

Over the next five years, Schwinn invested more than $600,000 in applications software, beginning with a payroll package from Management Science America, Inc. (MSA), Walsh said. "We had a very old payroll system that took almost a week to get out."

The system wasn't well documented, parts were written in assembler and, according to Walsh, "if something happened to a couple of key employees, we would not have been able to produce the payroll."

At the end of his first year, Walsh began shopping for a data base management system. He said waiting a year his biggest mistake.

In July 1982, Schwinn installed Software AG of North America, Inc.'s Adabas data base management system (DBMS) and its Natural high-level language. "We looked at all the major products that were available," he said. "We went to a number of [demonstrations], we called up the end users ourselves, took our own credit cards and took them to lunch, leaving the salesmen at home," he said. "Adabas and Natural just kept coming back as meeting our requirements in ease of use, ease of learning and [in the] ability to change [it] once you've got it started."

The two products brought the capabilities for fast implementation of modern-day support services, Walsh said. "We found we were able to design and implement a system in four days or five days," he said.

Foremost among the Schwinn-developed applications was an inventory management system giving employees access to previous-day inventory and previous-day sales figures. "All of a sudden we have a file passing system, a [DBMS] and a screen-writing system that told people things that they could never find out until 45 days after month end. . . . People just went nuts."

Hardware changes in the company included mainframe upgrades: from an IBM 370/115 to the 370/138 in 1980, to an IBM 4331 in 1982 and to a IBM 4361 last May. Singer Co. System/10 minicomputers at the company's four distribution centers were replaced with IBM's System/34 minicomputers, upgraded to System/36 minicomputers, which were installed in December 1983.

With the recent purchase of MSA's general ledger and accounts payable software package, Walsh said, Schwinn is nearing the end of its technology catch-up phase. "We've gone from obsolete, ridiculous technology to almost leading edge, while the business has gone from being complacent and average to catching up on 25 years of neglect," he said.

Yet Walsh is not without his worries. "The biggest single frustration is that we get a number of very valid, very rational, very outstanding requests that we can't get to right now because we've closed this 25-year gap in five years, and we're doing in one year what everybody else is doing in three or four — but we were 25 years behind to start with."

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (5 issues), May (5 issues), June (5 issues), August (5 issues), September (5 issues), October (5 issues), November (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

ISSN 0010-4841/85 $3.00 + $.80. $2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (air-mail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld*, Circulation Department, P.O. Box 1016, Southeastern, PA 19398-9984.

If you're looking at their non-impact printers, let ours open your eyes

• 60 pages in 60 seconds • Cut sheets in document order, with job separation • 8½x11 or 8½x14 portrait / landscape • Low energy use, low heat • Quieter, cleaner, no toner dust • Prints forms from memory • Lowest initial & operating cost

Mercurion™ is a high speed, non-impact printing system proven in hundreds of demanding installations. Quietest and cleanest printer in its class, it is at home in a business environment, yet handles 100,000 to a million sheets monthly with ease. All Mercurion features are accessed from the panel or via software, including 1 to 255 copy capability. Creates and uses variable forms simultaneously. Prints letter quality using up to eight resident fonts, including linguistic variations. If you are looking at Xerox and/or Big Blue, look at Mercurion too. The comparisons will dazzle you.

CALL 1-800-327-5602
In Florida, (813) 441-1981

SSi

Southern Systems, Inc.

CORP. HEADQUARTERS
100 North Belcher Rd. Clearwater, Florida 33575
SOUTHERN SYSTEMS (CANADA), INC.
1110 Sheppard Avenue East, Unit 15
Willowdale, Ontario M2K 2W2 Canada, Tel: (416) 229-2588

NEWS

Slowdown continues to plague computer industry

By Peter Burrill
CW Staff

LOWELL, Mass. — The computer equipment market continued to show signs of running out of steam last week when Wang Laboratories, Inc. became the latest manufacturer to warn that revenue and profits for the current quarter will fall short of earlier projections. Wang also said fourth-quarter and fiscal year 1985 profits will be less than in 1984.

Wang, which had been rushing ahead at a 30% growth rate in both sales and profits for the past several years, said last week that revenue and orders in the quarter ending March 31 are expected to show growth of only 10% above the same quarter last year. The company said its net profit margin is expected to dip to between 5% and 6%, from 9.2% a year ago, indicating that profits will be 30% to 40% below the third quarter of 1984.

The company said it experienced slower than expected orders growth in December and January and said that was a continuation of the slower growth experienced in the second quarter ended Dec. 31 when revenue growth dipped to 18%.

Several other manufacturers also have reported slower than expected growth.

Computervision Corp., of Bedford, Mass., said it also expected lower revenue growth for the current quarter and anticipates "break-even earnings"; that news came just one month after the company reported a 35% growth in profits for 1984 compared with 1983.

Earlier this year [CW, Feb. 18], IBM said "it will be very difficult to show any growth in earnings" for the current quarter due mainly to the international currency situation.

Data General Corp. also said it expects flat results in this quarter, and Hewlett-Packard Co. reported that orders growth in November and December was much below the pace of the year earlier.

Several Wall Street analysts have lowered their earnings forecasts for Digital Equipment Corp. and have lowered profit projections for the current quarter to slightly below last year's earnings. Apple Computer, Inc. recently announced one-week shutdowns of manufacturing plants due to bloated inventories.

The equipment manufacturing slowdown follows a slowdown in the semiconductor manufacturing industry, which more than six months ago began to realize that orders from equipment manufacturers were dropping off significantly. Semiconductor orders have appeared to stabilize somewhat recently but have not resumed the high growth rate of 1983 and early 1984.

Last week, National Semiconductor Corp. announced third-quarter revenue was just slightly ahead of a year earlier, and profits declined to $1.5 million from $15.4 million in the third quarter of 1984.

Justice Department reports ATM fraud losses exceed $70 million

WASHINGTON, D.C. — The nation's banks lost an estimated $70 million to $100 million during 1983 through the fraudulent use of automated teller machines, according to a report released last week by the U.S. Department of Justice.

The study, "Electronic Funds Transfer Fraud," indicated that, in many cases, ATM fraud involved unauthorized transactions with stolen or lost ATM cards. In 72% of the cases, the authorized user's personal identification number was recorded and kept near the card, typically in the owner's purse or wallet, or written on the card itself.

About 2.7 billion ATM transactions involving $262 billion were processed in 1983, the report said. A sample study of 2,707 "problem incidents" showed that 45% of those involved fraud. Almost two-thirds of the problem incidents involved withdrawals, and nearly one-third of those problem incidents involved unauthorized transactions with stolen or lost cards.

The bureau report describes the findings of the first effort to examine ATM fraud by sampling bank data. Sixteen large commercial banks participated in the study.

The study also analyzed electronic funds transfers but was unable to estimate nationwide EFT fraud losses. The 16 participating banks reported 139 "problem" EFT transactions, involving an average of more than $800,000 each, according to Steven B. Schlesinger, director of the department's Bureau of Justice Statistics. About 66% of these incidents resulted in an actual loss to the bank.

More information on the report (NCJ-96666) can be obtained from the National Criminal Justice Reference Service through Box 6000, Rockville, Md. 20850.

Your software strategies for the 1990s may depend on one seminar in 1985.

The Infodata Seminar.

Information Center strategies for the 1980s.

And beyond.

If you're buying Information Center software in 1985, chances are you're going to be living with it well into the 1990s.

So, before you buy, you'd better know the long-term strategic implications of that purchasing decision.

It all adds up to one thing:

You'd better come to the Infodata Seminar.

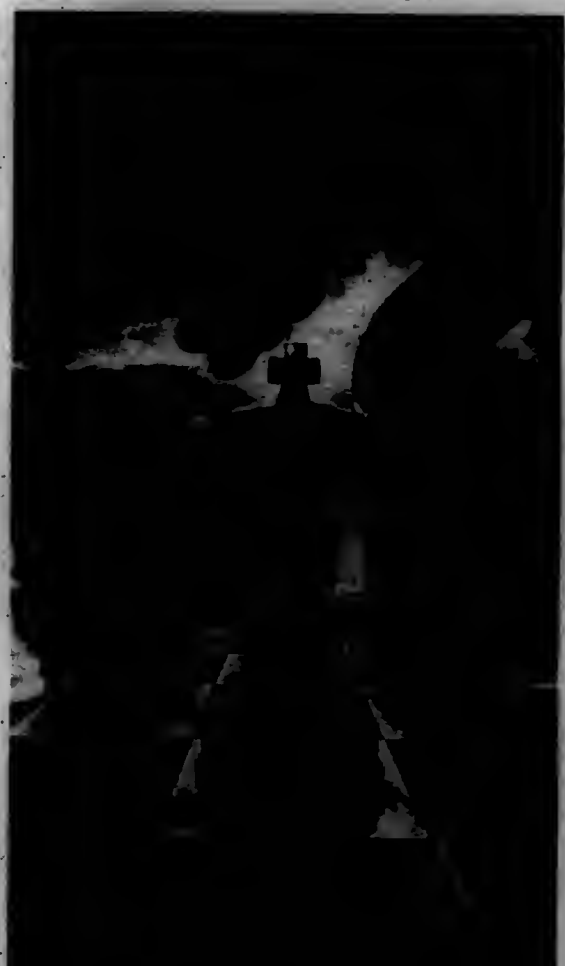
Sure, if you've got immediate Information Center needs, we've got the tools to meet them. And the product demonstrations at our seminars are a great place to see them.

But unlike most seminars, those tools are not the only thing you'll see. You will also see products that help you satisfy a diverse group of users with a wide range of needs—from simple query to full development; from database management to text management—a capability essential to any effective Information Center.

The Infodata Seminar. Where you can make your move in the present... and see the future at the same time.

To register for this morning seminar and a complimentary lunch, call (800) 336-4939. In Virginia and Canada, (703) 578-3430. Or write Infodata Systems Inc., 5205 Leesburg Pike, Falls Church, Virginia 22041.

Infodata products run on IBM or compatible 370, 30XX, 43XX, under VM/CMS, VS1, and MVS.



Atlanta, GA
June 11
Atlanta Marriott Downtown

Baltimore, MD
April 18
Hyatt Regency

Boston, MA
April 17
Boston Marriott Long Wharf

Calgary, AB
May 1
Calgary Centre Inn

Chicago, IL
May 8
The Westin Hotel

Cincinnati, OH
April 30
The Westin Hotel

Cleveland, OH
May 30
Stouffer's Inn on the Square

Dallas, TX
April 24
Loews Anatole Hotel

Denver, CO
May 8
Sheraton Denver Tech Center

Detroit, MI
April 4
The Dearborn Inn

Houston, TX
April 10
The Westin Galleria

Kansas City, MO
April 2
Adam's Mark

Los Angeles, CA
April 3
Pacifica Hotel

Miami, FL
April 4
Omni International Hotel

Milwaukee, WI
May 22
The Pfister Hotel

Minneapolis, MN
April 16
Granada Royale

New York, NY
April 11
The Roosevelt

New York, NY
May 29
Halloran House

Philadelphia, PA
April 10
The Hilton of Philadelphia

Richmond, VA
May 30
Richmond Marriott

San Antonio, TX
June 6
Hyatt Regency

San Diego, CA
May 29
Holiday Inn at the Embarcadero

San Francisco, CA
April 17
The Westin St. Francis

Somerset, NJ
May 7
Somerset Marriott

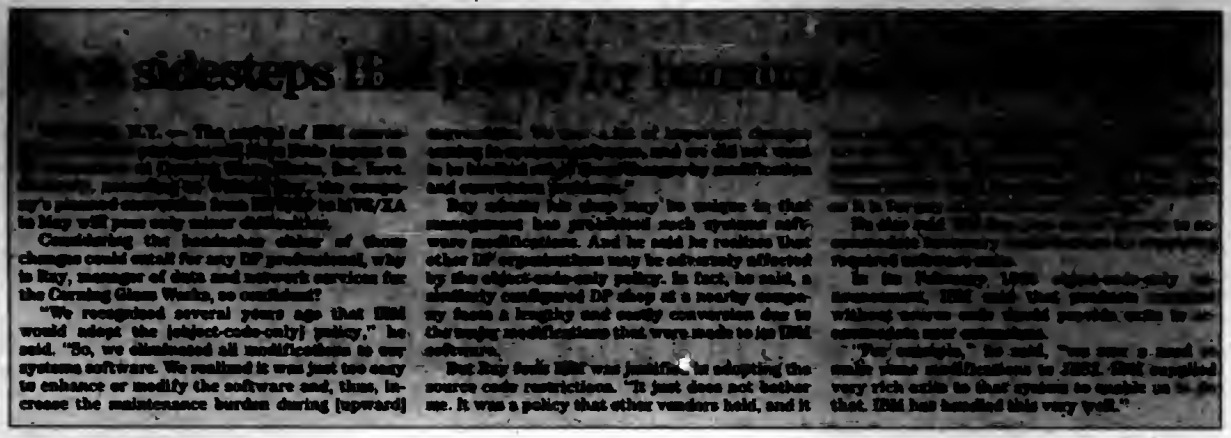
St. Louis, MO
May 9
Sheraton-West Port Inn

Stamford, CT
June 4
Holiday Inn Crown Plaza

Toronto, ON
April 3
The Sheraton Centre

Washington, DC
May 15
The Shoreham

INFODATA



sidesteps [illegible]

[illegible], N.Y. — The switch of IBM users [illegible] to the Big Blue lawsuit on [illegible] Glass Works, Inc. [illegible] recently by Corning, Inc., the company's planned conversion from IBM VM/SP to IBM VM/XA in May will pose only minor difficulties.

Considering the [illegible] effort of these changes could entail for any DP professional, why is Ray, manager of data and network services for the Corning Glass Works, so confident?

"We recognized several years ago that IBM would adopt the [object-code-only] policy," he said. "So, we eliminated all modifications to our systems software. We realized it was just too easy to enhance or modify the software and, thus, increase the maintenance burden during [upward] conversions. We use a lot of [illegible] changes coming [illegible] software, and we did not want to be limited [illegible] modification and conversion problems."

Ray admits his shop may be unique in that management has prohibited such systems software modifications. And he said he realizes that other DP organizations may be adversely affected by the object-code-only policy. In fact, he said, a similarly configured DP shop at a nearby company faces a lengthy and costly conversion due to the major modifications that were made to its IBM software.

But Ray feels IBM was justified in adopting the source code restrictions. "It just does not bother me. It was a policy that other vendors hold, and it [illegible] us it is for [illegible]

He also said [illegible] to accommodate necessary [illegible] required software [illegible].

In its February, 1985 object-code-only announcement, IBM said that products [illegible] without source code should provide [illegible] to accommodate user enhancements.

"For example," he said, "we were a small [illegible] make these modifications to JES2. IBM supplied very rich exits in that system to enable us to do that. IBM has handled this very well."

FIRE from page 1

available, a portion of the user community — most notably those who modified software — spoke out against the theory of object-code-only [CW, May 14]. Now, a growing number of users are being forced to deal with the policy in practice.

Mary Johnston, supervisor of systems coordination for Safeco Insurance Co. in Seattle, said in a recent interview that Safeco's data center management tried for months to obtain source materials for the version of IBM's ISPF the company had acquired.

She said the source code was to be used to add to ISPF an audit trail mechanism Safeco programmers had developed within Tone Software Corp.'s Full-Screen Mode (FSM) IBM TSO screen-editing facility, which Safeco had replaced with ISPF.

Johnston said Safeco tried to modify ISPF without the source code but met only limited success. That, she said, has left some users unhappy. "We are a large organization supporting some very large systems that have hooks into IBM software. We rely on source code, and IBM's policy change has caused a lot of concern about our ability to supply the same level of functions and service.

'We hold IBM responsible'

"For example, the [audit trail] modification was an accepted function that we could not transfer to ISPF. We hold IBM responsible for user dissatisfaction. We will have to put in extra planning and work to maintain the same service levels," she explained.

A potentially more serious problem looms on Safeco's horizon, however. According to Johnston, IBM service representatives have told Safeco that source code for IBM's IMS data base management system will not be fully available in the future. She said IMS supports Safeco's nationwide network of field agents. An IBM spokeswoman confirmed that at least portions of the IMS code already fall under the policy restrictions.

"We have made a lot of modifications to IMS," Johnston said. "If IBM withholds the source code, it would be a grave hardship for us. We are so committed to IBM that we cannot even switch to another vendor's [data base management] system."

Preparing for the impact

Other shops not currently affected by the object-code-only policy, such as the data centers at Westinghouse Electric Corp.'s Buffalo, N.Y., and Pittsburgh facilities, are making preparations to minimize its impact.

According to Annette Gillcrest, manager of distributed systems support at the Pittsburgh facility, Westinghouse is reviewing its modifications to IBM's JES3, scheduled to fall under the source restrictions.

"To date, the policy change has not had any real impact on us," Gillcrest said. "We are keeping close tabs on the matter because we know it will have a serious impact later. We are looking at our JES3 modifications with the intention of eliminating them, getting them out of the in-line code," she added. "Object-code-only will have a tremendous impact on us, and we have to prepare for it."

Gillcrest's colleague Jerome Pogorzelski, manager of technical support at Westinghouse's Buffalo data center, said his organization will face "a sizable chunk of work" in reacting to the object-code-only policy. Pogorzelski said the data center has made extensive modifications to IBM's JES2, including adding non-IBM device support and an in-house-designed tape management system. The absence of source code, he explained, will make it difficult for the DP staff to support those widely used enhancements in the future.

"IBM has said it will provide exits to support modifications," he said, "but there are not enough exits to support the hooks we currently have in the system. I am thoroughly against IBM's decision. I would tell IBM that, at least as far as JES2 goes, we just cannot live with that policy."

Some people — including Pogorzelski — claimed IBM initiated the object-code-only policy with little regard for its impact on users. But other users said IBM has tried to mitigate any hardships that could arise.

"IBM seems willing to work with users," Gillcrest said. "We are involved with Guide [IBM users group], which has sponsored a JES3 project to address the object-code-only policy. IBM is working with that project team to ease any conversion problems."

Duncan Macpherson, director of DP for the New York Department of Motor Vehicles in Albany, N.Y., agreed that IBM is committed to handling any user problems.

"When I first heard of the policy my reaction was that it would have a strong impact," he said. "But IBM has really beefed up its support centers, which, to users, is the only alternative to having the source code available. We were concerned about the effectiveness of that alternative, but it seems IBM has examined the possible impact of object-code-only and has made the necessary commitment to the support centers."

Support centers effective replacement

Macpherson's associate, John Fahey, manager of computer systems software for the New York Department of Motor Vehicles, said that IBM's Support Centers will serve as an effective replacement for the once-available source code.

"It all boils down to what you used the source code for," he said. "If you used it for troubleshooting, then the support center is the solution. If you used it to modify the software, then you will have problems in the future."

Not everyone is optimistic about IBM's ability to respond to user needs in the wake of the object-code-only policy. Glen Deichelbor, director of corporate MIS for Myrtle Beach, S.C.-based AVX Corp., said his programmers have made a variety of modifications and have diagnosed a multitude of systems problems with the aid of IBM-supplied source code.

"I am not pleased with the object-code-only policy at all, given IBM's response to our problems in the past," Deichelbor said. "I do not think the software has ever been stable enough that we can rely solely on the support center for maintenance."

While AVX's data center has not installed any object-code-only products to date, Deichelbor said the company is anticipating problems.

"When the restrictions reach the operating system level, that is when the impact will really be felt," he said.

NAS from page 1

last week in New York.

In essence, NAS' two latest machines provide a migration path for CPU-bound users of the company's existing AS/9000 processors, which will remain unchanged in price, Schoch said. To expand from a current top-of-the-line AS/9080 to the AS/XL-60, customers will reportedly have to swap boxes because the former top-of-the-line machines are not field upgradable to the AS/XL series.

Like their Sierra rivals, the AS/XL processors were designed expressly to meet the extreme performance needs of the corporate world's largest users. NAS classifies such accounts as "superlarge" installations, typically characterized by a 60% annual growth in processing requirements, Schoch said.

Formed entirely of very large-scale integrated circuitry, the AS/XL family reportedly uses 2,000 and 5,000 gate/chip ECL devices with switching speeds of 200 and 250 picosecs, respectively. Schoch said.

Thanks to the edge in switching speeds, the Models 50 and 80 outperform NAS' AS/9080 by 40% and 150%, respectively, he said.

In addition to implementing its main storage in 256K-bit random access memory chips, the AS/XL machines use 40,000 gate/chip Cmos logic devices in their associated I/O processors.

The logic and memory circuitry's density has reportedly cut the AS/XL line's footprint to just half of the AS/9080's. A Model 60 occupies 90 square feet of floor space, compared with 107 square feet for the Model 80, he said.

Both AS/XL series members are air-cooled and provide at least 32 channels and 64M bytes of main memory, which expand to a maximum of 64 channels and 256M bytes. In data-streaming mode, each channel reportedly transfers up to 3M byte/sec.

A minimally configured AS/XL Model 60 costs $4.8 million, compared with $8.9 million for an entry-level AS/XL Model 80. Volume shipments of both processors are slated to begin during the second quarter of 1986.

NAS is located at 800 E. Middlefield Road, Mountain View, Calif. 94040.

NATIONAL ADVANCED SYSTEMS CORP. (NAS)

System	AS/9060	AS/9070[2]	AS/9080[2]	AS/XL Model 60[2]	AS/XL Model 80[2]
[redacted]					
MIPS[1]	11.2	16.2	20	28	50
[redacted]					
Purchase Price[3] (Memory Size)	$2,308,000 (16M)	$3,249,000 (16M)	$3,074,000 (16M)	$4,840,000 (64M)	$6,970,000 (64M)
[redacted]					
Machine Cycle Time (Nsec)	30	30	30	Not available	Not available
[redacted]					
Cache (buffer) size	256K	128K[5]	512K[5]	256K	512K
[redacted]					
Price per 1M byte of main memory[4]	$11,800	$11,800	$11,800	$11,800	$11,800

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 4.5. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. Actual performance can vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.
4. Main memory enhancements are available in 2M-, 4M-, 8M- and 16M-byte increments, depending on the model.
5. Cache memory per CPU.
6. NAS offers a vector processor attachment for the AS/9000 models that costs $300,000. When this option is included the AS/9000 series processors become known as AS/9100 models. For example, an AS/9080 with the vector processor option would be called the AS/9180.

CW CHART

NAS storage products join AS/XL debuts

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — National Advanced Systems Corp. (NAS) last week complemented the debut of its AS/XL series mainframes (see page 1) with the announcement of several storage products, including a double-density version of the company's existing 7380 disk unit.

Reportedly costing 27% less per megabyte than its single-density counterpart, the dual-density module counters recent disk-related introductions by IBM [CW, Feb. 11, 1985] and joins two other additions to

See STORAGE page 10

NAS debut puts IBM on the spot in high-end market

By Jeffry Beeler
CW West Coast Bureau

With last week's introduction of high-end mainframes, has National Advanced Systems Corp. (NAS) temporarily put IBM on the defensive in Big Blue's favorite battle zone?

Although IBM continues to hold the all-important high-end processor market in an iron grip, the company will apparently lag behind NAS in bringing its top-of-the-line Sierra-class mainframe to market (see related story page 1).

But whether NAS — and its hardware supplier, Hitachi Ltd. — will be able to exploit its temporary advantage and siphon away large portions of IBM's high-end business remains to be seen. Opinions on the subject differ widely.

On one side stand industry observers like Phoenix-based Annex Research President Bob Djurdjevic, who expects the AS/XL announcement to create a "window of opportunity and allow NAS to gain market share at IBM's expense."

Djurdjevic's opinion is shared by Dave Moschella, a senior industry analyst with Framingham, Mass.-based International Data Corp. (IDC). "Having the fastest machine on the block at any point in time is a clear advantage and does increase a company's market share," Moschella said.

Moschella cited the results of a recent IDC survey in which performance requirements were found to be growing 50% annually among the very largest IBM 3081 and 3084 mainframe users.

Even now, there are signs of an impending capacity shortage. "Many of IBM's largest and most important customers need an [IBM Model 400-class] machine within the next six months," said Frank Gens, information systems research director for the Boston-based Yankee Group.

On the other hand, he added, an abbreviated shipment schedule may enable NAS to "beat IBM to the punch in selling high-end processors to the largest accounts."

Not everyone, however, views NAS' prospects so optimistically. Throughout the years, IBM has demonstrated a knack for "effectively countering the plug-compatible companies' actions," according to Harry Edelson, a managing partner in Edelson Technology Partners, Inc.

Another note of dissent is offered by E. F. Hutton & Co. analyst Michael Geran, who foresees a strong attempt by IBM to accelerate its Model 400 deliveries. "A prototype of the Model 400 is already running in Poughkeepsie, [N.Y.], and IBM indicated at a recent analysts meeting that it is going to do its [best] to improve the product's shipment date," Geran said. If the effort succeeds, the NAS Model 80's head start in availability may shrink from a year to six months.

STORAGE from page 9

NAS' memory products line. The two newcomers include an expanded cache controller and a 1M-byte dynamic working storage subsystem integrated into the AS/XL.

The double-capacity 7380 disk system boasts twice the track density of earlier 7380 versions, NAS said. The dual-capacity storage subsystems come with four head disk assemblies and an equal number of actuators, each supporting 1.26G bytes for a total of more than 5G bytes.

Like its single-capacity predecessors, the double-density subsystem uses ferrite heads, according to John Williams, manager of the firm's disk marketing. NAS will reportedly continue to supply the older 7380s alongside the enhanced versions.

Compatible with the company's existing 7880 disk systems controller, the double-capacity storage product comes in two models — the AE and BE. Each controller can support strings consisting of one AE and as many as three BEs.

Although single- and dual-density models cannot be intermixed, two strings of unlike capacities can be attached to the same controller, the company said.

The 7380's AE model costs $128,000, compared with $104,880 for the BE.

Taken with the two AS/XL processors, the dynamic working storage subsystem and the cache controller form the first members of NAS' Alliance product family.

With the introduction of its dynamic working storage subsystem, NAS is adding another layer to its memory hierarchy and reportedly boosting the AS/XL's processing and channel speeds by reducing access times for the mainframes' I/O and instruction processors. The dynamic working storage subsystem separates the two AS/XL machines' main memories from their cache buffers and I/O processors, according to NAS.

In a storage-related move, NAS has replaced its existing 7880-13 cache controller with an enhanced model that reportedly provides more functionality and up to four times greater memory capacity than its predecessor. The 7880-3C reportedly expands to a maximum of 64M bytes.

NAS has also provided the 7880-3C controller with a separate cache directory and a cross-coupling feature, the company said.

Prices for the 7880-3C start at $142,500, with volume shipments beginning during the second quarter of 1986. NAS is located at 800 E. Middlefield Road, Mountain View, Calif. 94040.

Higgins: Is unique better?

Conetic touts versatility, but tests prove inconclusive

Conetic Systems, Inc. began shipping Higgins, billed as an administrative assistant program, in December 1984. Since then, Conetic has aggressively marketed the product, making several significant claims about its versatility and uniqueness in the administrative software market.

The first claim is that Higgins can interact with some of the more popular programs, such as Lotus Development Corp. 1-2-3, Microsoft Corp. Word and others, by indexing all of these other programs' files, letters and spreadsheets.

Another claim is that Higgins is the only product available that offers expense reporting and multiuser local-area network support, which includes phone messaging and electronic memos.

These claims and the rising interest in administrative software in general have prompted several questions:

- To what extent does Higgins interact with other application programs, and to what extent does "interact" mean "integrate"?
- How well does Higgins' expense reporting module function?
- Since data organization and ease of data retrieval is the heart and soul of administrative programs, how well does Higgins rate on these issues?
- What should Conetic's target audience for Higgins be?
- Could the time spent in entering and updating the information for administrative programs be too costly in terms of opportunity costs, thereby outweighing any benefits to be accrued from the program's use?

Consists of nine modules

By way of explanation, Higgins comprises nine modules (see second table), all of which sit atop Conetic's relational data base system. This data base supports Higgins' capability to retrieve information both from within modules and globally through the use of user-defined keywords.

Installation on an IBM Personal Computer AT was accomplished fairly easily, following the simple instructions provided in the documentation. The documentation itself was found to be adequate for most uses but lacking in some extras that would have helped the user, such as including a function-key overlay.

There was minimal difficulty in learning Higgins' detailed security system of public and private passwords, but Higgins' overall commitment to user privacy throughout the course of review was impressive. Finally, Higgins provides useful, context-sensitive, on-line help simply by pressing one of the function keys.

To test Higgins' interaction with other applications programs, 1-2-3 was loaded onto a Personal Computer AT. The documentation describes how external files generated from within other applications can be retrieved and placed into the current Higgins file, although the user is unable to edit the external file itself from within Higgins' expense reporting feature.

It was not possible to place the 1-2-3 file successfully into Higgins, even after Conetic's technical support personnel went through the entire process. However, it was possible to move easily from Higgins to 1-2-3 and back again. Thus, the tests showed the only interaction with other applications that Higgins provided is with Higgins as an external umbrella, without any real file sharing.

The expense reporting facility was found to be the most impressive and useful element of the program. One of the most dynamic elements of Higgins, this module will be its primary selling point with managers and sales personnel who travel extensively. The user invokes the Expenses command and asks Higgins to assemble an expense report automatically for any user-specific period of time. When this is done, the screen displays the information, including an expense summary.

There is also a window that lists each item in more detail. User-defined expense categories are included in a third window on the screen, including totals for the given time period; any piece of information for each expense item can be easily modified. Even more impressive than the on-screen use of this facility is the quality of the report output. The first page of every report details each expense item. Weekly expense totals are also included, and the user can attach any pertinent explanatory notes to the report.

The second page is the summary report page, which includes first the expenses incurred specifically while traveling and then the total expenses registered during the given period.

Since administrative programs are billed primarily as organizational tools, the internal organization of data and the ease of data retrieval assume a great deal of importance. The structure of the program itself was fairly easy to understand, following the common hierarchical menu system convention.

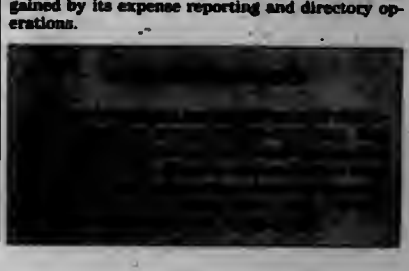
With Higgins' emphasis on integrating pieces of data between modules wherever possible, a rather intricate web of interrelationships resulted, often confusing the user. However, with intelligent use of the keyword method of data extraction, most pieces of information can be readily retrieved.

Multiplan-like commands

Higgins' overall organization and ease of use benefits greatly from its Microsoft Multiplan-like command line, which appears on the bottom of the screen. Users select the commands by striking the key corresponding to each option's first letter, and the keys are generally easy to understand, even for users who have never worked with administrative programs before.

Higgins' best audiences should be computer-proficient managers, executives and sales personnel who travel a good deal and corporate office users with local-area networks. The tutorial that Conetic provided assumes a fairly high level of computer knowledge, especially when discussing some of the more difficult aspects of the program. It fails to discuss even file transfer with other programs. Thus, a prospective user had better have a good working knowledge of computers and application software in general.

In conclusion, Higgins is one of the best administrative software programs in the micro market. However, after reviewing the program and spending a good deal of time using it, serious questions remain as to whether the time costs incurred in updating the scheduling feature and "things to do list" constantly would justify the time savings gained by its expense reporting and directory operations.



HIGGINS AT A GLANCE

Price $395 for single-user version
$200 per user (average) for local-area network versions

System Requirements

Computers	IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatibles AT&T Model 6300
Operating System	PC-DOS 2.0 or MS-DOS 2.0
Memory	256K random-access memory
Display	Monochrome or color

Peripherals Supported

Printers	Epson America, Inc., NEC Corp., Okidata Corp. and Mannesmann Tally Corp. (includes generic entry for other printers not listed).
Modems	Hayes Microcomputer Products, Inc. and Hayes-compatible modems.
Local-Area Network	IBM PC Network, 3Com Corp. Ethernetics and Novell, Inc. Netware

MODULE FEATURES

Time Management (Personal Scheduler)
- Appointment log, including time and description
  - —Tied to detailed appointment log where user can protect listing, add notes or link log to separate phone directory, thing-to-do list or expense report entry
- Monthly calendar highlighting current date
- Bar graph displaying appointments as blocks

Directory
- Telephone directory that lists name, company and telephone number
  - —Tied to detailed directory that can contain full address and personal notes
- Automatic dialing from telephone number entry through a modem
- Can use ascending alphabetical sort on either name or company listing

Things-To-Do List
- Can list things to do by description, priority status and due date
  - —Tied to detailed item list where user can protect entry or link it to a separate phone directory or appointment log entry

Expense Reports
- Accepts user-defined expense categories
- Does automatic subtotaling by categories
- Generates expense summary, listing date, item, category and amount
  - —Tied to detailed expense summary where user can specify purpose of the expense, to whom paid and location as well as link report to appointment log entry
- Generates automatic expense reports, with totaling by categories, and month-end summary reports

Personal Text Files
- Cross-references records stored in other modules
- Can add new file records
- Can search records by key words using logical operators or by starting or ending dates

Clock
- Can set countdown timer to sound alarm between one second and 60 minutes

Tickler/Reminder
- Can set alarm for specific appointment entries to sound between one minute and one hour ahead of the appointment time
- Automatic alarm chimes on the hour

Calculator
- Contains nine memory stacks that will accept user-defined names as well as values
- Floating-point precision accurate to six places
- Supports all standard math functions plus percentage and exponentiation

Scratch Pad
- Supports basic word processing and editing, including insert and overtype modes for up to two pages of text
- Allows automatic dialing from within text

CORPORATE PROFILE

Conetic Systems, Inc. was established in 1983; Richard Schwindt is the current president of the Portland, Ore.-based firm. Conetic Systems markets relational data base systems and an applications development system for both DOS and AT&T Unix as well as a full set of accounting products. Higgins is the first software package from Conetic's office automations group. Conetic Systems has a direct sales force of 10 employees that is marketing this product. Conetic Systems is located at Suite 180, 1800 S.W. First Ave., Portland, Ore. 97201.

SAMPLE LOG ENTRY SCREEN

Log — Friday, March 8, 1985 (67/298) — 9:33 a.m.

Schedule for Demo Date
Friday, March 8, 1985 (67/298)

7a 8a 9a 10a 11a 12p 1p 2p 3p 4p 5p 6p 7

APPOINTMENT LOG	
Time	Description
9:45 a.m.-10:45 a.m.	Artists Organization Meeting
12:00 p.m.- 1:30 p.m.	Lunch with Greg
3:00 p.m.- 5:30 p.m.	Artists Graphics Meeting

Select the option or type the Command letter

Log Select Commands: VIEW ADD DELETE PRINTER CALENDAR

March 1985

Sun	Mon	Tue	Wed	Thr	Fri	Sat
24	25	26	27	28	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DP shops excluding themselves from corporate concerns

CW AT EDP PERFORMANCE

By Edward Warner
CW Staff

TUCSON, Ariz. — The DP department has built a wall between itself and the business side of its company, and that wall has isolated DP from a role in corporate planning.

So claimed Max T. Horn, a consultant who spoke at Applied Computer Research, Inc.'s Conference on EDP Performance Management here last week. Horn said his recent survey of numerous DP departments found that those departments "had no role in a company's strategic planning."

Horn, president of Minneapolis-based Karlsson Consulting Group, Inc., said the wall could be traced to the historic distinction between companies' DP and business sides but charged that "we in DP are primarily responsible for this wall." The DP department, Horn said, isolated itself with what he called an imperial attitude, weak listening and writing skills and a tendency to offer "guesstimates" instead of concrete answers.

DP's attitude problem, he elaborated, is best illustrated by its use of the term "user" to describe someone who receives its services.

"How dare we within DP have the audacity to call others users?" Horn asked. "This gives the connotation that the company revolves around us."

Put off by this attitude, Horn said, people have lost their faith in the DP department and many have set about establishing their independence from DP by purchasing microcomputers or minis. Horn said this is bad news both for the in-house clients, who will miss DP's expertise, and for DP, which is letting infomation management get out of control.

To tear down the wall between DP and those it serves, Horn advised that DP staff members become more businesslike both in their way of presenting themselves — their style of dressing and listening — and in their attitudes, which, he said, should reflect the goals of the firm. He also advised DP managers to sharpen their writing skills, asking, "How many people do you know in DP with good writing skills?"

The role of the DP shop, he suggested, should be to provide services, not build systems, and to become more involved with users of its services, particularly at the initial design stages of a project. The projects that result are likely to be more sensitive to clients' needs, he said, adding that "if [clients] are really a part of the project team, they can't sit back and point fingers" at failures.

Horn also urged DP to rebuild its credibility by meeting a series of "small commitments" made to recipients of it services. The guesstimates, too, must go. "We have [to learn] to say no at times, [as in] 'No, I can't give you a number on that,' rather than offer a guesstimate," he said.

AT&T proposes rate revisions

WASHINGTON, D.C. — Responding to directives from the Federal Communications Commission and to comments from users, AT&T Communications has filed revisions to private-line rate restructuring plans that would reduce scheduled increases in voice grade and Dataphone Digital Service (DDS) rates but increase rates for switched private-line configurations.

The company said the changes "would mitigate rate impact on multipoint private-line users by reducing voice grade and DDS rates and by providing bridging of voice grade and telegraph local channels at the local exchange carriers' serving wire centers."

AT&T Communications said that the proposed changes, slated to take effect April 6, would result in an average 7.6% increase for private-line customers. It predicted that if the special access rates prescribed by the FCC for the local telephone companies were placed into effect as ordered, AT&T Communications would make further changes to the private-line tariff restructuring and that the increase could be held to 4.6%.

AT&T Communications said that voice grade private-line rates would be reduced by $74 million and that DDS rates would be reduced by $9 million. For voice private lines, the connect rate will be reduced from $20 monthly to $15.45, and the interoffice channel rate will be reduced by 5 cents for connections of more than 500 miles, while the fixed interoffice channel rate will increase by $25.

For DDS service, the central office connect fee will be reduced from $36 monthly to $20 for 2.4K and 4.8K bit/sec transmission, while the interoffice channel monthly rate for 2.4K, 4.8K and 9.6K bit/sec transmission rates will drop by 5 cents for distances of more than 500 miles.

Switched private-line services will face a 19.4% increase above existing tariff rates currently in effect.

Implementation of strategic plan vital to DP survival

CW AT EDP PERFORMANCE

By Edward Warner
CW Staff

TUCSON, Ariz. — A corporation's DP department needs a long-term strategic plan just as the corporation does. But what if the corporation has no written strategic plan for DP to use as a guide?

In that case, according to consultant Barry Wiegler, it may be time for DP managers to sit down with their firm's chief executives and "ask them where they [are] going."

Wiegler, president of Santa Monica, Calif.-based Key Consulting Group, Inc., made his remarks at Applied Computer Research, Inc.'s Conference on EDP Performance Management here last week.

DP managers can expect full cooperation from nearly all executives they approach to ask about the firm's strategic plans, Wiegler said.

Among the questions that Wiegler advised the conference attendees to ask in such cases were the following:

- What is the corporation's mission and philosophy? What business does the corporation see itself in?
- What assumptions about factors such as new laws or changing market conditions underlie the firm's way of doing business?
- Where is the corporation headed, and what new products can it be expected to unveil?

DP shop must gear up to meet needs

Each of these questions, Wiegler explained, has a corresponding meaning for DP. For example, he said, a firm that has the mission of becoming a nationwide corporation must begin now to expand its telecommunications capability.

A firm that expects to release a range of new products in another year, meanwhile, must gear up its DP shop now to meet the expanded needs of supporting those products, he continued.

Wiegler advised DP managers not to let the lack of a corporate strategic plan keep them from developing one for their department's use. "Two to three years from now," he said, "if [the DP department does not] have what [it] should have in place [in hardware and software], people aren't going to remember that it was because [the DP department] didn't have an effective corporate plan to follow."

An informal poll, taken by Wiegler at the end of his presentation, showed at least one-quarter of his audience work in firms where the DP or DP manager's position has been elevated within the last two years to a higher level of authority. In a show of hands, roughly half of Wiegler's listeners also indicated that they worked for DP departments that already had a long-term strategic plan in place.

However, Wiegler said, many firms do not have strategic plans, largely because implementation of these plans does not offer a short-term reward and actually draw top management's attention away from their day-to-day work.

Other factors that work against the adoption of a long-range plan, he said, were executives' disagreements over corporate direction or pessimism about their own ability to predict the future.

Subsecond response time: Productivity boon or bane?

CW AT EDP PERFORMANCE

By Edward Warner
CW Staff

TUCSON, Ariz. — Subsecond system response times can cause dramatic boosts in productivity. They can also increase error rates and drive up system costs.

According to analyst Phil Howard, president of Applied Computer Research, Inc., a Phoenix-based market research firm, those possibilities are chief among the issues raised in what he calls "the great response-time debate."

Howard, who spoke at the Conference on EDP Performance Management here last week, said DP managers should first study the type of work their shops are doing before they decide that decreasing response time to the subsecond range is worth the expense.

"My attitude is," Howard said, "if you can give them good response time, do it. If you can't, take a more reasoned approach." Such an approach would be at least to eliminate the variability in system response times, which he said is worse than a slow but predictable system.

Howard cited studies showing that subsecond response times do yield productivity rewards. "As you get down in the 1 second and below range, [programmer] productivity skyrockets," he said.

That research has also shown a "leverage effect" under which a drop in system response time may produce a cut in user response time that is as much as three times greater. In a shop with several hundred users, he explained, "you may be talking several thousand dollars [in savings] a month."

Research also shows that slow response times cause users to make more mistakes, he continued. The error rate, he said, is about average for a system with a response time between 1 and 12 seconds, possibly because users are "a little bit more careful about their inputs" out of fear of the wait they face if they make a mistake. Above the 12-second level, though, some research shows that "short-term memory is exceeded," and the error rate soars.

Howard argued that there are two sides to the response-time issue. On the unfavorable side, he said, are a host of adverse reactions that users may face under a system with a subsecond response time, including a sense of increased work stress and a greater error rate than in the 1- to 12-second range.

Regardless of whether they choose to pursue faster response times, Howard advised the 150 DP managers and instructors who heard his talk to work to bring consistency to their response times.

Kodak to acquire Verbatim and its 18% share of floppy disk mart

ROCHESTER, N.Y. — Eastman Kodak Co., which last year formed a division to manufacture storage diskettes and other mass media technology, announced last week an agreement to acquire Verbatim Corp. and the 18% share of the floppy disk market held by that California firm.

Kodak and Verbatim agreed to a cash tender offer of $7.55 per share, or approximately $175 million for the entire company.

Kodak, upon completion of the acquisition, will operate Verbatim as a subsidiary, keeping the Verbatim name on products and retaining established dealer and OEM arrangements, according to Kodak spokesman Charles Smith.

J. Phillip Samper, Kodak executive vice-president and general manager of the Photographics and Information Management Division, said acquisition of Verbatim's seven manufacturing facilities will enable Kodak to concentrate "on developing the technologies necessary for future high-density products."

In the fiscal year ended June 30, Verbatim posted profits of nearly $15 million on sales of $170 million.

Kodak announced its move into the storage market in October and one month later formed the Mass Media Products Division to set up manufacturing facilities for diskettes and to explore other technologies, including optical storage. At that time, it contracted for OEM products manufactured by Dysan Corp. and Xidex Corp., firms that have since merged and that represent Verbatim's largest competitor in the floppy disk market. Smith said Kodak will honor those contracts, but he declined to say when the contracts expire.

In addition to the mass media division, Kodak last year invested $20 million for a 7% equity share of Sun Microsystems, Inc. and was also the chief investor in a $5 million funding of Interleaf, Inc., a manufacturer of electronic publishing systems. In 1981, Kodak acquired privately held Atex, Inc., manufacturer of text processing systems for publishing.

IRS blames computer tax tape snafu on human error

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The ill-fated travels of Internal Revenue Service computer tape reel 301682 came under intense scrutiny by the U.S. Congress last week.

At a hearing of the House Ways and Means Committee's Subcommittee on Oversight, IRS officials admitted to angry legislators that the agency's Philadelphia computer center had badly mishandled that tape, setting off a series of events that resulted in the delivery of dreaded "notice of delinquency" letters to 26,000 businesses in the mid-Atlantic region.

"The basic facts surrounding the Philadelphia snafu are distressingly clear," according to J. J. Pickle (D-Texas), the subcommittee's chairman. "A federal tax deposit tape containing payment information concerning 26,000 taxpayers and nearly $300 million [in paid taxes] was not processed for more than three months," he said. Because the payments were not posted at the IRS, delinquency notices were automatically sent to taxpayers.

IRS Commissioner Roscoe L. Egger Jr. said the episode was the result of many human errors and inadequate management controls. He publicly apologized to the taxpayers involved and said steps have been taken to prevent recurrences.

"The problem was not that the computer broke down. The problem was that the computer worked [by sending the notices]. Unfortunately, the [IRS] individuals involved did not give consideration to the scope of the effects that a tape-posting delay might have," Egger testified.

According to Egger's testimony, the incident began in early October, when quarterly tax payments were processed by the IRS' Philadelphia Service Center and sent to the IRS National Computer Center in Martinsburg, W. Va., for posting on the master file. Because reel 301682 had faulty coding in its header, the national center could not process the tape, so it returned the bad tape and requested a replacement.

Replacement failed to run

In December, a program analyst at the IRS' Philadelphia office tried to make a replacement by putting a new header on the old tape, but this version twice failed to run at the national center — probably because some data was lost in the process of creating the replacement tape, according to Egger.

Finally, in mid-January, when taxpayer complaints came pouring into IRS offices, the matter was brought to the attention of the Philadelphia center's director. The valid portion of the tape was posted in late January, and the remaining portion was reconstructed from original taxpayer documents and posted by Feb. 9.

In his testimony, Egger outlined several corrective actions taken or planned by the IRS:

- Calls for replacement tapes must be logged and documented. Tapes must be replaced within 48 hours. Posting delays of more than one week will be reported to top management.
- The weekly tape status report will be used to monitor the posting of tapes and will be revised to show the date when a replacement tape was requested.
- IRS management will meet with field executives to increase their sensitivity to the importance of computer center actions on IRS services and taxpayers; provide a handbook on tape management; and study the use of computer-based tracking methods that would automatically hold up delinquency notices when there are posting delays.

Contributing indirectly to the incident, Egger said, was the preoccupation of IRS employees with the Service Center Replacement program, under which virtually all of the hardware and software at the centers was replaced.

WASHINGTON UPDATE
Mitch Betts
CW Washington Bureau

GAO suggests need for privacy policy

WASHINGTON, D.C. — The increasing use of computer matching to verify data on those who receive U.S. and state government benefits suggests that Congress should consider the need for a new policy for national privacy, according to a major report conducted by the U.S. General Accounting Office (GAO).

"Government policies and procedures to protect privacy and data confidentiality are not uniform, and oversight responsibility is unclear, fragmented or nonexistent," according to the GAO report.

Existing privacy laws provide some protection but may not be adequate, the office said.

The GAO suggested that Congress review such issues as data security and computer crime, the centralization of data bases, the cost-effectiveness of computer matching, the merits of front-end computer matching and the role of the Social Security number as a national identifier.

"Because nearly every American will sooner or later apply for [government] benefits of one kind or another — and will undergo the questioning and data searches related to eligibility decisions — any look at eligibility verification should consider how such efforts do or could infringe on individual privacy," said U.S. Comptroller General Charles A. Bowsher, chief of the GAO.

Weather agency tries automated observers

WASHINGTON, D.C. — Automated systems for collecting surface weather observations are being installed in Kansas by the U.S. Department of Commerce to help modernize the National Weather Service, the department announced recently.

The year-long project aims to demonstrate that a national Automated Surface Observing System can provide essential data for weather forecasts with minimal human involvement, the announcement said.

The units will record hourly measurements of wind speed and direction, temperature, air pressure, sky conditions and precipitation. This information will be relayed in computer-compatible form to National Weather Service offices and will be used to prepare local weather forecasts and warnings.

DP exec defends ICST from hefty budget cuts

WASHINGTON, D.C. — A DP executive from an insurance company recently came to the defense of the National Bureau of Standards' Institute for Computer Sciences and Technology (ICST), a $10 million per year agency whose budget would be cut 50% under the Reagan administration's budget proposal for fiscal 1986.

John A. Gosden, a vice-president and technology officer of the Equitable Life Assurance Society of the U.S., testified before the U.S. House Committee on Science and Technology that the ICST budget should be preserved because the ICST is a "critical national resource for the development of vital, urgently needed federal, national and international standards."

Gosden, a member of the independent ICST Evaluation Panel, said the ICST performs the same function for the federal government that he does for Equitable Life — providing guidance and standards for the use of computer technology.

"An expenditure of $10 million to more effectively utilize $14 billion in federal information technology expenditures would be money well spent even if we ignore the benefits to the private sector," he said.

The ICST, according to Gosden, has developed standards or guidance manuals on computer network protocols, computer security, software development, software maintenance, data base management and computer graphics.

The ICST has been "a leader throughout the development and revision of Cobol," he said.

"While I generally support efforts to reduce the federal budget," Gosden concluded, "it seems [to be] common sense that one doesn't cut a program whose products boast a return on investment of [more than] 25-to-1."

Conference to focus on foreign trade restraints

WILLIAMSBURG, Va. — A conference sponsored by Transnational Data Reporting Service, Inc. on how business can help lower foreign restrictions on high-technology exports, services trade and international corporate communications will be held here Oct. 30 to Nov. 1.

The conference, titled "The International Information Economy, Agenda for Action," will focus on obstacles to expanding U.S. trade and investment.

Topics to be covered at the conference include foreign requirements forcing companies to use locally manufactured electronic data processing equipment, restrictions on using electronic mail systems and prohibitions on exporting certain types of data.

Other topics to be discussed at the Transnational Data Reporting Service conference will deal with incompatible equipment standards, copyright infringement, cultural rules and threats to tax data transmission.

The Transnational Data Reporting Service specializes in advisory and consulting services on international information and communications regulatory developments.

Foreign leaders from 40 countries are expected to attend the conference.

The conference registration fee is $625.

More information is available from Transnational Data Reporting Service, which can be reached through P.O. Box 2039, Springfield, Va. 22152.

NETS from page 1

and toward various brands of micros on a net. The next step, which Gerald Stillman, the firm's vice-president of product development, expects to be accomplished in the next few months, will be to extend the net throughout the company.

As companies increasingly link their personal computers with networks, the nets provide significant benefits over stand-alone micros. Micro networks can perform jobs — ranging from office automation to transaction processing to software development — that formerly would have fallen to a minicomputer or a mainframe.

Recent interviews with micro network customers found a lot of enthusiasm and differing opinions on a net's pluses and minuses. Index Technology's Stillman said that "We're just scraping the surface with local-area networks."

Advantages over stand-alones

At present, the biggest benefit micro nets offer over stand-alone micro setups is access to hard disk storage and backup, according to John Kane, project manager for marketing and office systems at Rockwell International Corp.'s Automotive Business Group in Troy, Mich., which has about 100 personal computers on a Nestar Systems, Inc. network.

Kane and others also pointed to the potential advantages of shared data bases, although they all mentioned unmet needs in multiuser network operating and applications software.

Celanese's Mengel, however, said that the largest benefit of his network "is the common user interface." Each station on the net provides the same menu, applications and services, he emphasized.

Mengel also underlined the way in which a common software base speeds installations and updates for an entire users group. With Micropro International Corp.'s Wordstar running under a micro network license, if Mengel wants to modify the program, "I go in and patch that area at night and everyone on the net has it the next morning," he said. In addition, backups are simplified.

While printer sharing is another highly touted benefit of micro networks, some downplayed the importance of that feature. "We do have a few print servers, but that has not proved to be the most successful use," Kane said. Users with a personal computer on their desk "don't want to chase around the building for that," he added.

Almost all the net users contacted have or plan to install electronic mail, with the biggest holdup being the perceived need to provide each user with a micro. But Mengel felt that "if [personal computers] are in every major area in the plant," they do not have to be on each desk, as electronic mail can be sent to secretaries, who then print it and circulate it within their work groups.

Micro nets also provide a logical gateway to mainframes and external systems, according to Kathy Wilson, manager of systems development for central engineering at Raychem Corp. in Menlo Park, Calif. Her group has put about 20 users on a 3Com Corp. Etherseries network, and she expects to upgrade the net with a new server that will both support additional users and provide a gateway to the company mainframes.

MICRO NETS

Comparing overall costs for networked micros and stand-alone personal computers is tricky, users agreed. The benefits of some network features, such as electronic mail, are difficult to quantify. Other potential advantages, such as lower cost per user for software licensed for delivery from a network server, have not yet been realized.

The quickest comparison pits the cost of the network storage system against the costs of equipping each personal computer with a hard disk drive. However, some users still equip many machines with local hard disks because network access may be noticeably slower. Loading a large program off the network may take 30 or 40 seconds, so it may make sense for developers to work directly off their own hard disks, Index Technology's Stillman said.

Post cited cost as a prime reason for choosing a micro network for the Dutch Bristol-Myers plant.

Running a manufacturing system on a large time-shared machine at peak hours, Post's firm was "getting slaughtered on time-sharing costs."

A micro network may also offer performance advantages over an overloaded time-shared system or allow quicker updates to data bases.

Another advantage is redundancy. "If you were to lose the network, you still would have the valid stand-alone machines," Mengel remarked. In one case, his network's hard disk drive crashed into scrap metal condition, but he provided all users with backups within an hour and a half.

There is a broad choice of single-user software to run on micros, Mengel pointed out. "Minicomputer software is much more expensive and your choices are limited."

And the computer remains "personal," others said.

Microcomputer network weaknesses

But customers pointed to some weaknesses of micro nets as well. Most important, they said, is that although the technology is evolving rapidly, networks generally do not provide the software choices or the overall polish available with minicomputer systems.

"My first wish would be good multiuser software produced for [micro] network use," Raychem's Wilson said. Micro network versions of development tools, data base managers and other applications now are entering the market, and the industry expects the IBM PC Network and

See NETS page 18

NETS from page 17

Microsoft Corp.'s Microsoft Networks to provide a standard network environment for software vendors. But network managers said they do not expect any flood of multiuser software.

Current copy-protection and licensing schemes often make it difficult to run popular software packages on a micro network, and users would like vendors to change their policies. "We'd like to see [Lotus Development Corp.'s] 1-2-3 network-approved," Kane said.

Installation, maintenance difficulties

Users said they also had difficulties installing and maintaining their networks. In one case, a network with a grand total of two personal computers bogged down while the three vendors who supplied the system, the network and the applications software squabbled about who was responsible.

Networks "are still in their infancy," and technical expertise is rare, according to one OA manager at a large New England high-tech firm, which ran into serious problems while setting up two networks with a dozen personal computers each. "We just can't get support, and we can't continue that way."

"You still need expertise to set it up," according to Raychem's Wilson. For example, "you're never really sure, until you try it, that an [AST Research Inc.] or [Digital Communications Associates, Inc.] Irma or other third-party board will be compatible," he said.

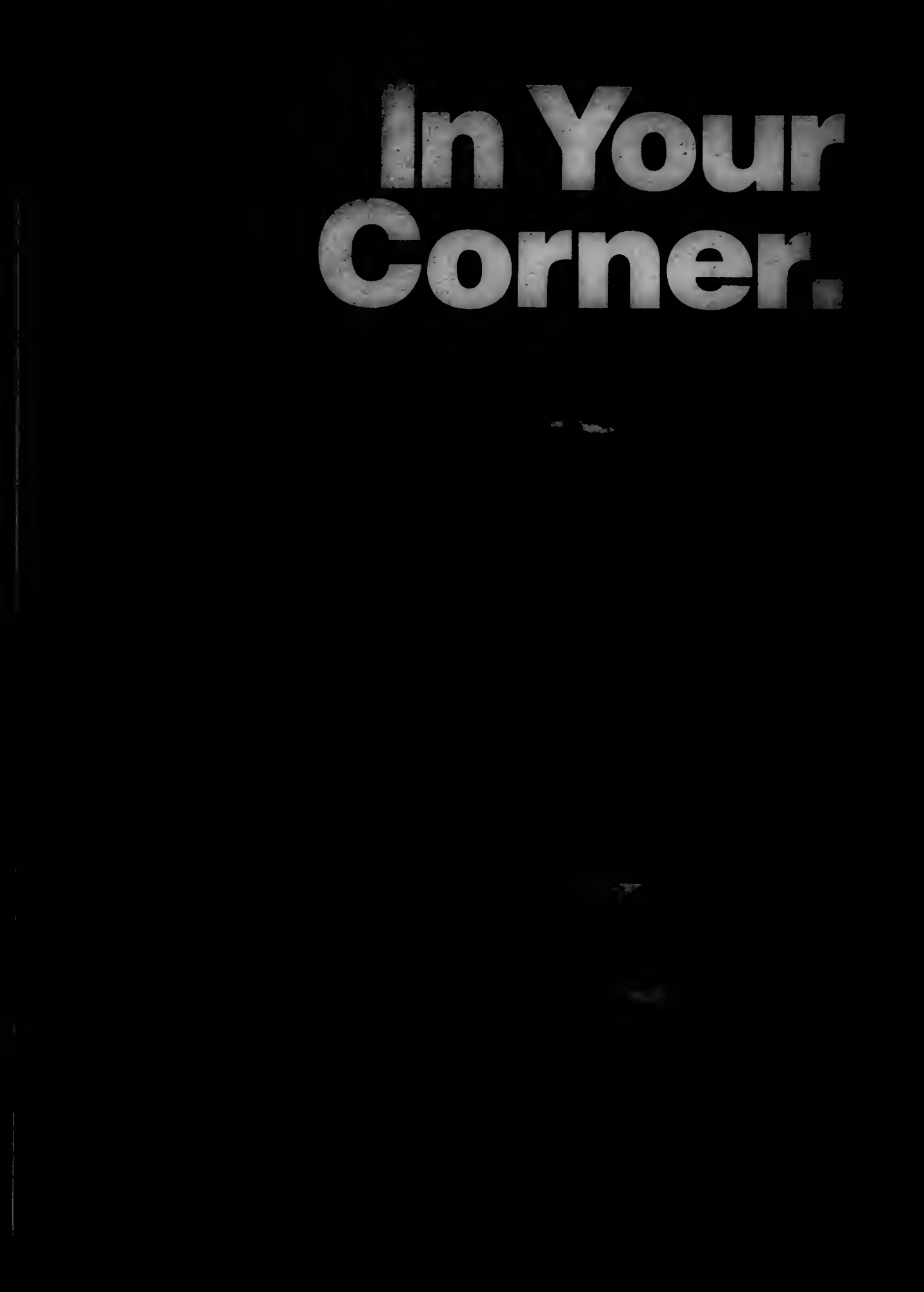
'Far from an operator-free environment'

Once the micro network is up, it stays up, according to Post, but "it's still far from an operator-free environment." Technical people from his New York-based staff rotate duty at the Dutch plant. Although he would like to see the network run without specialized help, "I can't say we'll ever achieve that goal," Post said. At this point, the net's remote-diagnosis tools are not nearly as strong as those available for time-shared systems, he added.

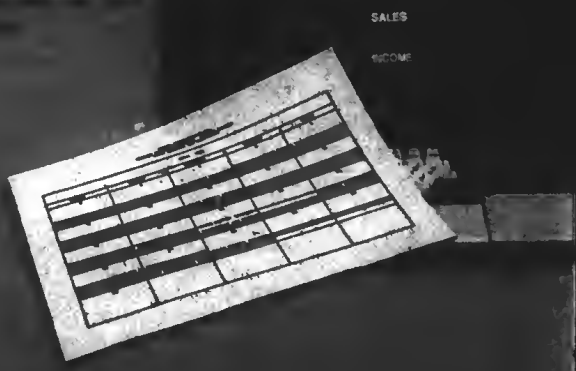
These are among the reasons why many microcomputer network enthusiasts still see an offering — such as the IBM System/36 or Data General Corp.'s CEO — available as a system from a single vendor as strong competition. Stillman commented that vendors "still have a long way to go to smooth out the network".

But, Post said, "I see a lot of what was done on time-sharing shifting to these networks." Five years ago, many users turned to time-sharing systems for work done once a month, he noted. "I see a lot of that shifting to [personal computers], and where there's shared data involved, shifting to networks," he concluded.

In Your Corner.

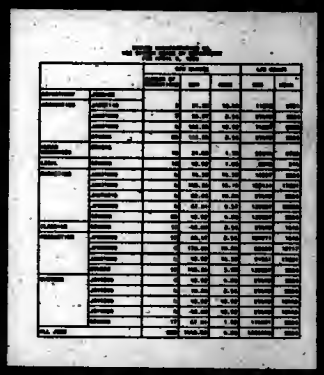


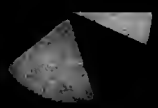
The SAS System. . .



The Solution for Your Information Center

Now Available for IBM PC/370





CW0190S

☐ I want to learn more. Send me The SAS Solution packet.
☐ Have a sales representative call me today!

Please complete this coupon or attach your business card.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ ZIP _____
Phone (_____) _____
Hardware _____
Operating System _____

SAS Institute Inc.
SAS Circle, Box 8000, Cary, NC 27511-8000

SAS.

IDEA introduces the missing pieces.

IDEA is shipping new ideas for IBM's System 36.

Whether you have an IBM minicomputer or mainframe, IDEA offers a complete line of cost effective solutions for linking your IBM PC, XT, AT or Portable to your host.

Introducing the new IDEAcomm 5251.

The IDEAcomm 5251 communications card supports a twin-axial cable connection allowing your IBM PC, whatever the model, to communicate with the IBM System 34, 36 and 38. Communications may be local or to an IBM 5251 Model 12 display controller.

Complete 5250 terminal emulation is supported for monochrome and color displays. Since IDEAcomm 5251 does not use DMA channel resources, there is no interference with hard disks or network cards.

Our new IDEA Minicomm is amazingly versatile.

If you need a truly versatile communications card for your IBM PC, you need the IDEA Minicomm. Supporting both Bisync and SNA/SDLC protocols, the Minicomm allows remote communications over synchronous modems, and may be used locally with a modem eliminator.

And now IDEA offers four new software packages for the Minicomm:

- IDEAcomm 3270/BSC
- IDEAcomm 3270/SNA
- IDEAcomm 3770/SNA
- IDEAcomm 3780/BSC

IDEAcomm 3278 is fast and flexible.

The IDEAcomm 3278 provides a coaxial connection to IBM 3274/3276 controllers with powerful file transfer. In benchmark studies, IDEAcomm 3278 transmission speed on a local mode 3274 was up to 60% faster than IRMA. And it takes just one key stroke to upload or download files. TSO and VM/CMS file transfer is standard.

Our great ideas work with the IBM AT.

At IDEA, we believe that one good idea deserves another. Our products now work with the IBM AT. You can network and share resources with the AT on IDEAnet, mount our 20MB IDEAdisk internally to the AT, or connect our 5MB to 120MB IDEAdisks externally to the AT. With IDEA, the new AT can communicate to IBM host mainframe or minicomputers too.

Call **800-257-5027** for the IDEA dealer nearest you. You'll see why lately, IBM has been getting some great ideas from IDEA.

IDEAssociates

The best IDEAs for personal computers.

IDEAssociates, Inc., 35 Dunham Rd., Billerica, MA 01821 (617)663-6878 Telex 94-8245,
IDEAssociates S.A., 5, Route de Chêne, CH1207 Geneva, Switzerland
(22)86.11.19 Telex 428 388 IDSCH

Software firm uses local net in product development

Plans dial-up access, further applications

CAMBRIDGE, Mass. — Index Technology, Inc. (Intech) here is a 1½-year-old developer specializing in workstation software for computer systems analysts. Its products run on the IBM Personal Computer line. "The initial rationale for buying a local-area network was to improve our development," said Gerald Stillman, vice-president for product development.

Intech programmers work in C language on a remote Digital Equipment Corp. VAX minicomputer until a working version of the software is created. They then transfer the software to personal computers for testing. However, "there's no reason to continue to develop on the VAX," Stillman said, because the time-sharing costs are high and the setup requires another step in debugging.

A programming shop limited to stand-alone personal computers, however, loses the advantages of communications and shared data bases, and "we felt the need for a shared data base," Stillman said. Another motivation was to get the best use from a new $10,000 laser printer, he said.

A net also can act as a test bed for customer installations. Although Intech's Excelerator product runs on a stand-alone micro, the software typically is sold to a company working on large projects involving many analysts, he pointed out.

Intech became a beta test site last fall for a network offered by Banyan Systems, Inc. of Westboro, Mass. Ten programmers now work on six micros running on the net.

Stillman said he expects the network to expand and offer other functions — accounting, word processing, advertising, customer support and others — during the next few months. Employing roughly 60 people, Intech has about 30 micros engaged in a variety of tasks, he said. "Even our assembly people use [personal computers] for testing software and doing quality assurance."

MICRO NETS

As the network turns into a companywide resource, "it becomes the responsibility of the MIS department," Stillman said. However, Intech is just creating such a department.

The Banyan virtual networking system concept, offering the potential of connecting various types of personal computer nets, was a particular attraction, Stillman said. "One of the many reasons people don't jump into networks is that they're afraid to commit to any technology or any company," he said. As one benefit, the virtual network's ability to handle machines and nets from a range of vendors might allow hookup of the several Apple Computer, Inc. Macintoshes in use at Intech, he said.

Another potential benefit is access to a VAX, mainframe or public data base through Banyan gateways, he said. He also expects the company to install dial-up access to the net for micros at regional offices.

As a beta installation, Intech found a number of bugs, but Stillman said the firm was very happy with Banyan's support. Earlier this year, Intech purchased the net.

Among future enhancements, Stillman said, he would like to see improved facilities for data sharing, including record-level locking and exclusive file access.

Intech software engineer Joshua Estrada commented that the network does not give any way to maintain library records. For example, he said, ample opportunities for confusion arise if four users sequentially update a file.

INSTALL from page 18

ing," and his group ended up writing its own print server because Nestar's "was just ugly." Post added, however, that the vendor's offerings have been improved since that time.

Supporting a net at a remote location raised particular difficulties.

"You can't dial into something like Nestar's [local-area network] and act like you're on a [personal computer] on the [local-area network] for quite a number of technological reasons," Post pointed out. "If you access it at [1.2K bit/sec] or even [9.6K bit/sec], it will take a year and a day to load a long program, so dialing into a network straight is unfeasible."

Some packages allow a micro to act as a remote console for a networked personal computer, he noted. "With a slave [personal computer] dedicated to me, any processing could be done in Holland. But there are all kinds of problems with it."

"Disaster plan? That's our master plan!"

Net support needs differ

As personal computer networks move into crucial roles for departments or larger organizational groupings, they bring growing requirements for ongoing support — requirements that may or may not end up in the hands of a DP/MIS department.

In many organizations, personal computer networks have evolved, like personal computers themselves, from the bottom up, without any blessing from the computer systems staff, and they are still run by the people who set them up.

Kathy Wilson, manager of systems development for central engineering at Raychem Corp. in Menlo Park, Calif., said her background in management rather than DP probably has been beneficial because "I put myself on the user side."

When her group installed a micro net, Raychem's MIS department "wasn't looking at this as anything very serious," she said. "We were mavericks." However, "now our MIS department is really taking notice." The net often has much better information than the MIS group and sends data to the larger systems, she said.

Although four people now support Raychem's 20-user 3Com Corp. network in one way or another, "if the network ever stopped expanding there wouldn't be much required," Wilson said.

She said she expects the crucial task of backup to be handled automatically when a new 3Com multifunction server is installed.

"We have a network with between 12 and 17 users, and it takes about 10 hours per week in systems management," estimated Bill Driscoll of LAN (West), a network reseller and consultant in Carefree, Ariz. That covers maintenance, upgrades, new installations, backups and other work.

Some smaller network customers do not do all that, he said. "If you don't mess with it and don't put additional products on it, you can get along with doing backup only."

"Any network system with more than 12 users needs at least a part-time administrator," said Matt Mengel, process control and automation coordinator at a Celanese Corp. Fibers Operations plant in Salisbury, N.C.

THE MONITOR MONITOR FOR CICS

MORE THAN A REPORT WRITER

FINALLY AN ALTERNATIVE TO PAIL AND CICSPARS.

Data Management

Summarize and compress application and systems data into a cumulative file. Long range reporting via user-defined control fields and double word capacity. One job execution for reporting and historical management of all systems.

- Automatic monthly history extraction
- User defined history control fields
- Tape and disk support for all operating systems
- Capacity planning and trend analysis reports

Data Collection

Comprehensive record of transaction performance. System overhead in five categories. Each day's environmental and performance history maintained for online access.

- User defined file controls
- Space saving data compression
- Supports UFO™, MANTIS™, GENR/OL™, NATURAL™, and DMS™
- Automatic file repositioning and file wrap around option
- User friendly clocks, counters, and online exits
- High-performance VSAM RRDS

Reporting and Accounting

Custom hardcopy reports assist in performance and trend analysis, capacity planning, transaction accounting, and problem determination. Select, edit, and report data via the report writer. Charges based on resource fields, total cost or actual consumption.

- CICS overhead, user clocks, and counter reports
- User exits and daily total page
- Report tables and automatic field spacing
- Variable page length and width
- Data selection and exclusion

Online Features

Online features utilize "user friendly" techniques. Superience for application tuning. Menu driven system. Graphic real-time, task, storage, and file monitoring systems.

- Automatic problem alerts
- Track and tune CICS storage
- Daily performance replay
- Online historic data review
- Shows CICS file and DL/I database performance

NEWS

Strategic plan handles change

By Charles Babcock
CW New York Bureau

NEW YORK — If you are in the information services department and your business is undergoing rapid change, you had better hope your department has a strategic plan, according to a speaker at a recent gathering of the Association for Systems Management.

Geri M. Riegger, vice-president of electronic data processing operations at Blue Cross/Blue Shield here, told the New York chapter of the group that information systems are agents of change. In dynamic businesses such as banking, chemicals or health care, the rate of change threatens to undo the department.

"Strategic planning in this era of change is not a necessity; it is the key to survival," she said. Yet, two-thirds of all information systems departments lack a strategic plan, she said.

A strategic plan for information systems is "an extract of the overall business plan," Riegger said. The business plan indicates where the organization wants to go and what it hopes to achieve. The information services strategic plan explains how information systems will help the organization achieve its goals.

"[A strategic plan] is active. It is not a plan that implies to the systems manager 'here is what the environment is going to do to me.' It is a process of defining desired states and developing direction-setting concepts," Riegger said.

> *'Strategic planning in this era . . . is not a necessity; it is the key to survival.'*
> — Geri M. Riegger
> Blue Cross/Blue Shield

The strategic plan for a company with multiple computer networks should address whether the firm will continue to add networks or will merge. It should also determine how important it is to users to communicate with each other on different networks.

Riegger said a strategic plan can also be defined by what it is not:

- An extrapolation of the past. "If that's all you do, you don't need a plan. You'll get that anyway."
- A collection of division or function plans. The U.S. Navy gathered its function plans and stapled them together, calling the result a strategic plan, but it was not, Riegger said. "Strategic planning is not the sum of many parts. It is a high-level plan," she said.
- A replacement for management judgment. Some organizations believe the strategic plan, once it is drawn up, answers all questions, Riegger noted. Changes will occur causing the plan to be modified, and management will still have to decide what the next step is based on current information, she said.

From 1982 to 1984, Riegger was a member of the National Academy of Sciences Committee on Review of the Navy's long-range planning in data processing, and from 1977 to 1982, she guided strategic planning of the Operations Group of the Federal Reserve Board.

NOMAD2 + SQL/DS:

Made For Each Other

NOMAD2, the premier 4-GL/DBMS, and SQL/DS, IBM's wave-of-the-future database system, have been combined to form the single most powerful information management resource available. And those who have seen this dynamic combination in action agree that the two systems were made for each other.

The NOMAD2-SQL/DS combination is much more than just an interface. It is the blending of the best 4-GL with the best DBMS available that comprises an entity greater than the sum of its parts. More specifically, the broad spectrum of capabilities that comprises SQL/DS can be accessed and controlled by dealing solely with NOMAD2.

NOMAD2's single-command environment, unmatched report writer, statistical and interactive decision support capabilities and, most importantly, its richness of language have made it the hallmark 4-GL against which all others are measured. And it is through these attributes that the sheer power of SQL/DS can be fully realized.

The NOMAD2-SQL/DS interface represents the latest innovation from D&B Computing Services. In making NOMAD2 available for use on in-house mainframes, we have continued the evolutionary process we began in 1975 when NOMAD was first introduced. And it is this evolutionary process that has catapulted NOMAD2 to the leadership position it holds in the marketplace.

If you are currently using SQL/DS in your VM environment, or even if you're just considering it, take a look at NOMAD2 now. Most people who try NOMAD2 buy it.You owe it to yourself to find out why.

NOMAD2: An Innovation In End-User Computing From Dun & Bradstreet

D&B Computing Services

a company of The Dun & Bradstreet Corporation

For more information call Roger Cox at (203) 762-2511. Or drop your business card into an envelope and mail it to Roger at D&B Computing Services, 187 Danbury Road, Wilton, CT 06897.

Naisbitt ties automation, decline of middle management

By Jeffry Stecker
CW West Coast Bureau

SAN FRANCISCO — High technology is radically redrawing corporate organizational charts by rendering middle management largely obsolete, according to best-selling author James Naisbitt.

Throughout modern corporate history, middle managers have served primarily as intermediaries through which business information flowed back and forth between senior executives and bottom-echelon support personnel.

Today, however, the same communications tasks are increasingly being shouldered by computers. The result is that, within many large corporations, vast numbers of middle managers are rapidly disappearing, Naisbitt said last week during a gathering of Wang Laboratories, Inc. customers.


Naisbitt

"Computers are replacing middle managers much faster than robots are replacing assembly line workers," the author of *Megatrends* told approximately 500 attendees of Wang's Enterprise West users group meeting.

Naisbitt predicted in the meeting's keynote address that in the end, computing's widespread acceptance in the big-business world will smash the pyramid of the traditional management hierarchy.

In his speech, titled "Reinventing the Corporation," Naisbitt said that market pressure is forcing large companies to transform themselves into "information organizations." He described information organizations as businesses that are fast becoming indistinguishable from their own MIS-related activities. Although the transformation is especially pronounced among banks, no industries are entirely exempt from its influence, Naisbitt said.

Naisbitt noted a fundamental change in the composition of today's corporate work forces, where hired staff members are increasingly giving way to contract laborers.

Naisbitt also noted the unprecedented, breakneck pace at which the U.S. economy is giving rise to start-up ventures. Because the accent in American commerce is increasingly shifting from automobiles to computers, this "explosion of entrepreneurship" is inevitably spawning a profusion of hardware and software vendors, Naisbitt said.

But precisely because of their vast numbers, thousands of the fledgling high-tech enterprises are doomed to go under, he warned.

Systems seminar set to discuss human resources

NEW YORK — The American Management Association will sponsor seminars in Cambridge, Mass., and Washington, D.C., for information systems and human resources professionals on the topic, "Implementing an Automated Human Resource Management System."

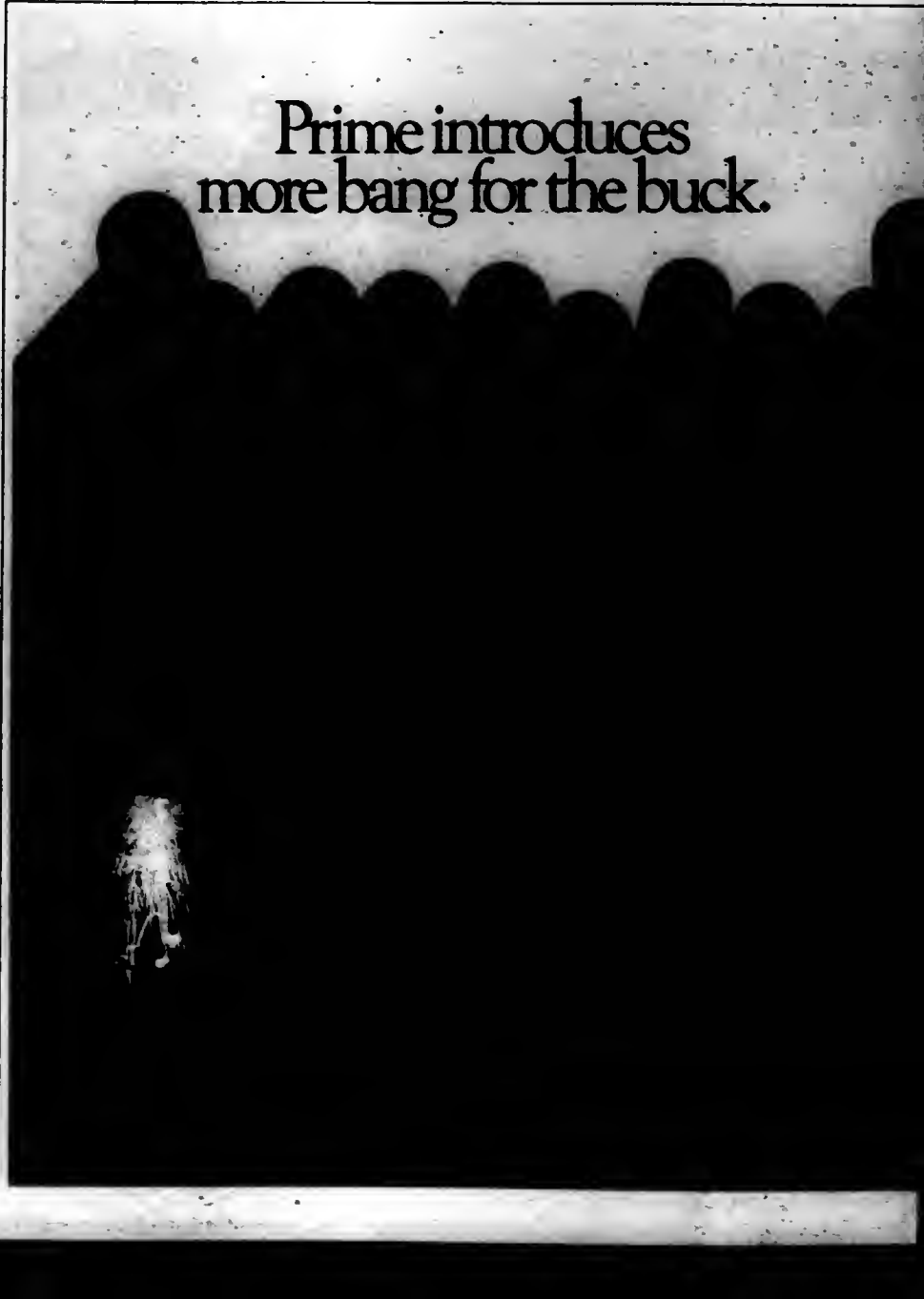
The Cambridge seminar will be held May 6-8 at the Royal Sonesta Hotel. The Washington course is scheduled for June 10-12 at the association's Management Center.

The course leader for both meetings will be Marc S. Miller, president of Marc S. Miller Associates, a New York-based consulting firm specializing in the development, implementation and enhancement of human resources information systems (HRIS) and programs.

Topics to be covered include HRIS concepts and objectives, personnel functions, privacy and security issues, data base specifications, cost/benefit guidelines and vendor evaluation techniques. Guest speakers will include administrators of corporate human resource management systems.

Individual registration fees are $695 for each seminar for association members and $800 for nonmembers. Team fees for three or more registrants are $590 per person for members and $695 for nonmembers.

More information is available from the American Management Association, 135 West 50th St., New York, N.Y. 10020.



Shipper's freight-tracking net also bears text/data load

A ship of the Atlantic Container Line

By Charles Babcock
CW New York Bureau

NEW YORK — When six European firms formed a container ship company in 1965, they wanted a control system that would track the status of thousands of containers in transit to ports in the U.S.

Executives at the Atlantic Container Line figured that computerized controls would save enough on container costs to pay for their first computer system, said Hans Wieting, general manager of management information services at the company.

But effective container control required more than a central office processor and software. Atlantic Container's 24 district offices, spread across the northeast U.S. and Canada from Baltimore to Detroit and Toronto, needed to be linked with New York in an interactive network to follow the status of each container.

Message sending as well as tracking

Once such a network was established, Atlantic Container found that, in addition to tracking containers, it wanted to send administrative messages giving directions to agents and allowing them to query the home office, Wieting said.

The way the firm built this feature into its container control network put Atlantic Container "in the upper stratosphere of [Burroughs Corp.] mid-range customers," said Stephen P. Baxter, group director of marketing operations at Burroughs. The shipping firm cut its annual telex bill in half once it began sending text messages over its network, according to Wieting.

The network was built on a modest mainframe base, developed by a 17-person department that was trimmed back to 11 as recessions cut profits in the shipping industry in the early 1980s. Since 1975, Atlantic Container found it could meet its needs with medium-size Burroughs computers.

'Bert and Ernie'

The firm currently uses two B3955s, dubbed "Bert" and "Ernie," with one serving for limited applications and as a backup, Wieting said.

From the start, Atlantic Container geared its central processor to serve as the hub of a rudimentary network. Its first machine, a Sperry Corp. 418 II, was formatted to receive container data sent to New York via telex, he explained.

Atlantic Container replaced the 418 II with a Burroughs B4700 in 1975 and established its own leased line network to the district offices. As sending and receiving devices, it purchased 20 Burroughs TC3500 printing terminals. The terminals had no screens, relied on small tape drive memories and required skilled operators, but they made the embryonic network operational, Wieting explained.

Nevertheless, it was a network with severe limitations. The data it transmitted had to be strictly formatted, and only limited forms of information, such as how many containers were at a given location, could be retrieved by it, he noted.

'Tape all over the room'

For that reason, Atlantic Container continued to use telex for text or administrative messages. A telex sent to New York was punched out on

See SHIP page 30

Houston to host NCR users

HOUSTON — The Federation of NCR Corp. Users Groups will hold its 15th annual international conference called Nucon:85 from April 28 to May 1 at the Westin Galleria here.

The conference will offer more than 60 sessions and is expected to draw 1,000 attendees and more than 40 vendors with booths. The conference theme is "Information Exchange: An Investment in Excellence." The keynote speaker will be Col. James B. Irwin, an *Apollo 15* astronaut, who will speak on how to motivate individuals to new levels of achievement. Also scheduled to speak is NCR Chairman and President Charles E. Exley Jr.

Panel discussions are planned for NCR's ITX, IRX, Imos and VRX operating systems, personal computer links, latest software updates and systems optimization. Other topics will include how to improve programming productivity and how to develop in-house training. An executive program will feature Dr. Gunther Klaus from the Institute for Advanced Planning, who will lead a day-long session on the need for changing management structures in today's business environment.

Conference registration fees are $430 prior to April 6 and $530 after that, the sponsors said. More information is available from Nucom:85, Central Services Office, 1780 Kettering Tower, Dayton, Ohio 45423.

On-line information services meeting set for end of April

NEW YORK — Developments in the on-line information field will be discussed at the sixth annual National On-Line Meeting to be held here at the Sheraton Centre from April 30 to May 2.

More than 3,000 participants and 120 exhibitors are expected to attend, according to the conference's sponsor, Learned Information, Inc., an on-line information industry publisher.

Learned Information said the conference will focus on the growth of on-line services, especially for microcomputer users, and will also look at the application of such services in medicine, business and finance, engineering and other fields.

Special sessions will reportedly be held on electronic mail and bulletin boards and data base management systems for data base development using on-line services.

The registration fee for the full conference is $220 if received by April 1. After April 1, registration cost for the full conference is $240. The daily registration fee for the conference is $100 before April 1 and $110 thereafter.

Learned Information is located at 143 Old Marlton Pike, Medford, N.J. 08055.

SHIP from page 29

tape. The tape was then ripped off by hand and fed into a tape reader to be retransmitted to another district office. A staff of seven was required for the task, and paper tapes "were constantly hanging all over the message room," Wieting said.

The company began to automate this function in 1976 when it purchased a Digital Equipment Corp. PDP-11/40 and installed it as a message switch.

With this system, a telex coming into New York could be automatically rerouted by the PDP-11/40, which would either send it to a printer or dial up a teletype to pass it to its destination. The new system allowed Atlantic Container to reduce its message room staff by three, Wieting said.

Transfer from telex to network

At the same time, he added, Atlantic Container was paying $200,000 a year for telex messages, and "somebody said, 'Hey, we have all these leased lines. Why don't we try to send administrative messages over our own network." This was accomplished with an interface that allowed data messages to continue to go into the central processor while text messages were switched to the PDP-11/40, where they would either be printed out or passed on to their destination.

In 1981, Wieting said, the firm replaced the PDP-11/40 with a device designed specifically for the job — a Mercury message switch made by Honeywell, Inc.'s Communications Network Division.

A year ago, Atlantic Container replaced the printing terminals with interactive CRT terminals from Beehive Corp. in Salt Lake City. It then added Burroughs CP9672 communications processors at eight scattered locations. The communications processors concentrate data, sending it in bursts to New York, reducing line overhead and tying up the central processor for a minimum amount of time. The hardware in the network, excluding the central office computers, cost about $1 million, according to Wieting.

Now just over a year old in its latest form, the network saves $100,000 in annual telex bills and pays for itself in ways that are harder to measure, including better customer service, better information and more efficient use of invested capital — ships and containers.

It's easy to marry multiple mainframes successfully when you bring Single Image Software into your growing CPU family.

Every day thousands of S.I.S. users depend on Super-MSI™, MSM®, and GCD® to protect data integrity, share DASD more efficiently, streamline operations and increase system throughput. Because S.I.S. products solve the problems of multiple CPU environments better than any other hardware, software or job scheduling options available. And with dramatically less CPU and input/output overhead.

Transparently, S.I.S. products work across systems to give you the increased power and productivity you want from a multi-system complex, but with the operational simplicity of a single unit system. With S.I.S., you get the benefits of a good CPU marriage. But you can feel like you're single again.

M S I CPU marriages can be complicated. And sharing DASD only makes matters worse with data integrity violations, hardware RESERVE lockouts and job back-ups causing major problems. But not when you have Super-MSI, the Single Image Software Multiple Systems Integrity facility. Super-MSI guarantees data integrity in your shared DASD environment without RESERVE lockouts. By locking only at the dataset level, Super-MSI frees up data volumes to more users so you get increased productivity and total peace of mind.

M S M Managing the allocation of tape and mountable disk drives in a CPU marriage is under control when you install MSM. Automatically, the Single Image Software Multiple Systems Manager eliminates accidental tape overwrites and costly job reruns that result from manual device monitoring and scheduling. This is so valuable in avoiding midnight phone calls from second and third shift operators with overwriting errors. With MSM, your operators can concentrate on more important tasks while you can save hardware dollars by cutting superfluous device costs out of your budget.

G C D And for saving more time, talent and total hardware costs, GCD, the Single Image Software Global Console Director, allows any console in your system to be logically linked to all systems, consolidating control messages from multiple systems in a single, ordered stream. With GCD, an operator can read messages, issue commands and respond to replies all from one terminal. Imagine the increased efficiency and speed of throughput that gives you.

So stop struggling through your CPU marriage. Be a smart S.I.S.S Y instead. Send for more information on how Single Image Software can improve CPU relationships at your datacenter. Call 800-237-2057 (in Florida, (813) 263-5011) for a free 30-day trial of one, or all three S.I.S. products today.

cga Software Group Products

960 Holmdel Road, Holmdel, NJ 07733

I'm sold on S.I.S.

If you want to save a CPU marriage, think S.I.S.S Y

NEWS

OFF THE PRESS
George Harar

BOOK REVIEWS

CAD/CAM HANDBOOK
Edited by Eric Teicholz

Here's the accumulated wisdom of 20 specialists on how to acquire and use computer-aided design and manufacturing.

In the last few years, turnkey systems priced under $100,000 have made CAD/CAM available to the 30,000 companies in the U.S. with yearly sales of as little as $5 million. Now personal computer-based systems cost in the range of $25,000.

"Compared to CAD/CAM's virtually phenomenal potential, its current usage could be described as antediluvian," Stanley Klein and Peggy Kilburn write. "In U.S. manufacturing, penetration is variously estimated at between 5% and 10% of potential users."

Once a technology used mainly by the aerospace and automobile industries, CAD/CAM is now within reach of almost any drafting, engineering or manufacturing firm. The starting point of CAD/CAM and its related technologies — computer-aided engineering, computer-integrated manufacturing and so on — is the engineering drawing stored in digital format. "It is this picture data base," Klein and Kilburn write, "that leads to virtually all the benefits that a user can derive from CAD/CAM technology, including such seemingly remote uses as job estimating, inventory control and financial analysis."

Robert Miller's important chapter, "Understanding and Measuring Productivity," cautions that long-term benefits may take from five to 10 years to be realized. "In fact," Miller says, "managers of many companies currently using CAD/CAM systems are still unsure of how they will benefit most from the technology." His advice: Ask the users.

Anthony Horn offers an example of immediate productivity. It takes about 30 to 45 seconds for a good drafter to draw a straight, scaled line. Using CAD/CAM, positioning the cursor and entering direction and time parameters with the stylus takes five to 10 seconds.

Hardcover, 432 pages, $49.95, ISBN 0-07-053403-3. McGraw-Hill, Inc., 1221 Avenue of the Americas, New York, N.Y. 10020.

THE CHIP
By T.R. Reid

Who were Jack Kilby and Robert Noyce?

If you answered 'inventors of the integrated circuit,' perhaps you know much of the history described in *The Chip*. But if author T.R. Reid's contention is correct, "Not one American in 10,000 could name the two countrymen who invented the integrated circuit and launched the Second Industrial Revolution."

Reid, a journalist on the national news staff of *The Washington Post*, was moved to write this history when his malfunctioning VDT came to life again once a *Post* technician replaced — what else — a chip. Some quick research led the author to an inspiring conclusion: "This miraculous chip was a man-made miracle."

Well researched and written, *The Chip* contains little-known facts that dramatize the 25-year history of integrated circuit development. In a discussion of the simplicity of the binary numbering system, Reid states, "The Romans, for all their other achievements, never hit on the idea of zero."

Another fact: In 1961, Fairchild Semiconductor announced the first commercially available integrated circuit. It cost $32. Ten years later, the price of an integrated circuit was $1.27.

The integrated circuit was first used commercially in a hearing aid in 1964. The first consumer application of the chip was in the Texas Instruments, Inc. pocket calculator marketed in 1971. TI sold five million calculators in 1972. In 1976, the nation's premier slide rule manufacturer, Keuffel & Esser Co., went out of business. Intel Corp. sold the first microprocessor in 1971. The personal com-

puter got its start in 1975, when an article in *Popular Electronics* described how to build one using an Intel 8080 microprocessor.

Beyond the facts, the best attribute of Reid's book is the overdue respect it finally pays to the integrated circuit's developers. Incredibly, Kilby and Noyce arrived at the same concept — the so-called "monolithic idea" — working independently of each other. Kilby, an engineer with TI at the time, got the idea in July 1958, about six months before Noyce, who was working at Fairchild. But Fairchild produced a more refined working model of the circuit prior to submitting a patent application, which proved crucial in winning the patent for Noyce.

Development of the integrated circuit came at a crucial time for the electronics industry. Power and heat restraints limited the size of electronic devices built from vacuum tubes. Design limitations were removed when the transistor was invented by Bell Laboratories in 1947; engineers could now draw plans for circuits using 500,000 transistors. But the connections still had to be made by hand, which was an expensive, time-consuming and unreliable process.

Getting the circuit off the ground was not easy. Established companies like GTE Sylvania and Westinghouse Electric Corp. approached the chip cautiously, which paved the way for TI and the Silicon Valley upstarts. Contracts from the National Aeronautics and Space Administration in the early days of the moon race helped the chip manufacturers survive. When designers of the second-generation intercontinental ballistic missile *Minuteman II* switched to integrated circuits in 1962, sales took off and the chip's future was assured.

Reid aims his book at the casual reader by explaining binary code, basic electronics, Boolean logic and how a simple computer works step-by-step. But skip over the basics and there is still much rich history to read.

Hardcover, 243 pages, $15.95, ISBN 0-671-45393-9. Simon and Schuster, Rockefeller Center, 1230 Avenue of the Americas, New York, N.Y. 10020.

— John Desmond
CW staff writer

APPLICATION DEBUGGING
By Robert Binder

This no-nonsense book states a clear problem — application programs that abend while running under IBM's MVS operating system — and offers clear answers for the programmer who must get the program working again.

The premise here is as follows: "Faced with an abend, the immediate need is for a solution, not an education in IBM operating system concepts."

The book grew out of the author's crib notes as a programmer in various MVS installations. Sixty common abends are presented for Cobol, assembly language, PL/I and Fortran programs. Possible causes are listed and possible solutions follow.

In the remaining three sections, the author offers common diagnostic aids, identifies useful information on a dump and shows the procedure for finding source program errors.

Hardcover, 366 pages, $29.95, ISBN 0-13-039346-7. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

BOOKS OF NOTE

INTRODUCTION TO UNIX SYSTEM V, the first in a series geared to those learning AT&T's version of the operating system, by Robert Byers. Paperback, 210 pages, $17.95, ISBN 0-912677-29-5. Ashton-Tate Publishing Group, 10150 W. Jefferson Blvd., Culver City, Calif. 90230.

Publishers wishing to have their books considered for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Book Review Editor, Computerworld, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Four systems managers receive ASM professional certification

NEW YORK — Four systems managers here have been designated certified systems professionals (CSP) under a certification procedure of the Association for Systems Management (ASM).

Named were George E. Daus, systems manager at Merrill Lynch & Co.; David Henry, manager of productivity improvement at Manufacturers Hanover Trust Co.; Matthew J. Hierons, informations systems training analyst at Home Life Insurance Co.; and Gerald Rogers, project manager for office automation at IDC Data Services.

The 11-month-old certification procedure attempts to establish knowledge standards and a code of professional conduct for those employed in the information management field.

During its implementation year, which ends May 31, applicants may be certified on the basis of their education and experience. Five years of experience are required with at least one year in management, consulting or project management. After May 31, applicants must pass an examination to be certified. Holders of the CSP designation must undergo periodic recertification through continuing education.

CALL FOR PAPERS

SECOND INTERNATIONAL PERSONAL ROBOT CONGRESS & EXPOSITION (IPRC)
San Francisco, Sept. 6-8

Papers are being sought by May 1 for this second international exposition. Prospective speakers should submit three copies of an abstract to the IPRC '85 Organizing Committee for its review and approval. The abstract should be detailed enough to allow an assessment of the proposed paper but should not exceed 250 words.

For complete details on submitting abstracts, contact Sharon D. Smith, Chairwoman, IPRC '85 Organizing Committee, 8822 S. Martin Lane, Conifer, Colo. 80433.

THE FIFTH ANNUAL CONFERENCE OF THE ASSOCIATION OF HUMAN RESOURCE SYSTEMS PROFESSIONALS, INC. (HRSP)
Los Angeles, May 14-17

A call for papers has been issued by 1985 Conference Research Chairman E. Phillip Daro. Entries must be postmarked by April 1, and winning papers will be recognized and discussed at the annual HRSP meeting in May.

Papers may be of any length, technical or nontechnical, relating to human resource information systems development or applications to personnel data needs. The papers will be judged for HRSP by an independent panel of magazine editors, educators and personnel systems specialists.

Authors wishing to be considered for an award in a new category for unpublished writers should mention on their papers that they have not previously been published in the field of personnel systems. Address entries to E. Phillip Daro, HRSP Manager, Ebasco Services, Inc., Floor 79, Two World Trade Center, New York, N.Y. 10048.

THE THIRD ANNUAL EASTERN AMERICA NCR USERS CONFERENCE
Atlantic City, Oct. 17-18

Abstracts and technical papers are now being sought for this third annual conference. Suggested topics for entries include disaster recovery planning, operating systems tips, multivendor software environments, implementing communications networks, systems applications, data base techniques, personal computers and the mainframe, man/machine interfaces and industry-specific topics, which include the banking, retail, hospital and manufacturing industries.

Abstracts should be 100 words or less and must be submitted along with title, speaker's name, company affiliation, address and telephone number.

All abstracts must be sent by April 5 to Frank Whalon, Tinius Olsen Testing Machine Co., P.O. Box 429, Willow Grove, Pa. 19090. All speakers will be notified of acceptance and schedule by April 15.

WHAT'S IBM DOING TO GET YOU OUT FROM UNDER YOUR APPLICATIONS BACKLOG?

According to industry surveys, over 90% of America's data processing departments have a backlog of applications requests that ranges from three months to three years.

And three years is an awfully long time to wait for anything.

The problem is, with most computer systems, including IBM's System 36, most applications must be developed by experienced programmers. It's a time-consuming process that can account for up to half of your data processing department's budget. And there's a significant "lost opportunity" cost to the end-user as well.

Fortunately, Wang has a solution.

WANG MAKES PROGRAMMING AS EASY AS READING A MENU.

Only Wang offers Professional Application Creation Environment (PACE), a software system for the Wang VS that gives end-users everything they need to develop software applications on their own.

FEATURES	WANG VS 85	IBM SYSTEM 36
Migration without conversion up to 192 users	Yes	No
32-bit Architecture	Yes	No
Cache	Yes	No
Object Code Compatibility	VS 15, 25, 45, 65, 85, 100, 300	36 only
Virtual Memory Operating System	Yes	No
Removable Storage Options	Yes	No
Local Area Networks	Yes	No
Architectured for OA/DP	Yes	No
Relational Data Base	Yes	No
Industry de facto Standard Word Processing	Yes	No

What makes PACE a true breakthrough is its Application Builder. It lets just about anyone create complete applications—without writing, documenting or debugging a single line of code. All you have to do is follow the menu and use the function keys.

With PACE, as much as 80% of your applications requests can be handled by end-users instead of programmers. Which means that your programmers will be free to take on the more complicated jobs, and your applications backlog will shrink significantly.

JUST GIVE US ONE SHOT.

PACE is just one reason why the Wang VS family is the perfect solution for your departmental data processing problems.

There are lots of other reasons we'd like to tell you about, including our worldwide service and support program. And we'd also like to prove ourselves in a benchmark test.

So call Wang at 1-800-225-9264. Or write to us at the Wang Business Executive Center, One Industrial Avenue, M/S 5413, Lowell, MA 01851.

WANG

NEWS

INTERNATIONAL REPORT
CW International News Network

AUSTRALIA

MELBOURNE — The Roy Martin Research Center is switching from its $1 million IBM environment to equipment from Digital Equipment Corp. because IBM's communications do not suit the center's requirements, according to Gary Morgan, company director.

Morgan said the company wanted a multiuser, multidisciplinary environment capable of handling the firm's 300 asynchronous on-line clients with minimum support. "Our users have a whole spectrum of terminals under time-sharing, dial-in and dedicated conduction, and IBM protocols are too demanding," he said.

HONG KONG

HONG KONG — During a recent Far East visit, the senior marketing executive from Digital Equipment Corp. told an audience here that the role of DP managers is changing and evolving away from that of a corporate decision maker. "Business is changing too fast," Mark Roberts said. "DP managers were in charge, but now they are being moved [into] a service role."

FRANCE

PARIS — Users of IBM and Bull equipment can now integrate these systems by using a new series of Bull communications software that interconnects the network architectures of the respective companies, a Bull spokesman claimed. Known as the Open System Facilities, the software reportedly enables workstations in Bull DNC/A networks and IBM Systems Network Architecture systems to access either network.

■

PARIS — Compagnie Generale d'Electricite (CGE) has been discussing joint ventures with Wang Laboratories, Inc. Under negotiation is the interface between Wang equipment and a private automatic branch exchange from CGE's telecommunications subsidiary, CIT Alcatel.

Reportedly, CGE also wants the license to manufacture and sell Wang's office automation equipment in France.

JAPAN

TOKYO — Hitachi Ltd. has unveiled its own answer to the IBM Sierra 3090 series. Hitachi's M-68 processor group comprises the M-680H uniprocessor and the M-682H dyadic processor, a spokesman said. Both machines have a maximum main storage capacity of 256M bytes, according to the vendor, and perform two to six times faster than Hitachi's existing processor lineup.

The systems will be available during the fourth quarter; the M-680H will lease for $196,000/mo, and the M-682H will lease for $312,000/mo, according to the Hitachi spokesman.

Hitachi also announced the H-6585 line of storage units, including a 5G-byte disk unit, which are said to double the capacity of the vendor's previous offerings. Hitachi's storage units will likewise be ready for shipment during the fourth quarter, according to the spokesman.

These products, available only to the Japanese marketplace, were also introduced last week in the U.S., under the National Advanced Systems, Inc. label.

■

TOKYO — Honeywell, Inc. has largely withdrawn from the Japanese computer market and has handed over its systems business to NEC Corp. under the terms of a recent agreement.

The name of the resulting company is NEC Computer Systems, which will sell NEC and Honeywell products with an emphasis on NEC equipment, according to sources.

■

TOKYO — NEC Corp. has unveiled an enhanced version of the company's 20/18 office system. Called NEC System 8, the low-end machine features the vendor's Itos-4 operating system and is compatible with NEC's 100 and 150 series. It can be used in a stand-alone or distributed workstation mode, has a communications facility and can connect up to two units

NEWS

of 5-in. hard disk with 20M bytes of memory each. Pricing starts at $8,150, and the product is available immediately.

NETHERLANDS

AMSTERDAM — IBM has terminated the authorization of a Personal Computer dealer here, the Inad Computer Group, alleging that the dealer was selling Personal Computers via unauthorized software houses and other third parties.

At the same time, Xerox Computer Services announced IBM has given it approval to package Xerox manufacturing software with the IBM 4300 series for sale in the Netherlands.

SWEDEN

STOCKHOLM — As of March 4, Swedish Commodore has taken over the sales and marketing here of its Vic and Pet product lines from Datatronic, a Swedish distributor.

Analysts say the move will result in lower prices and enhanced customer support.

■

STOCKHOLM — AU Systems has announced a Swedish network evaluation software system for users of Digital Equipment Corp. VAX-11 VMS systems.

The program, which is called Avinac, is menu-driven and can determine the costs and reply time of the most commonly used computer network structures, according to a spokesman for the vendor.

■

STOCKHOLM — The Swedish Aviation Authority has built a data base detailing all plane crashes in Scandinavia since 1970, which number approximately 2,000, in an effort to improve flight safety. The data base enables flight security analysis, a spokesman said. Copies of the reports can be obtained from the aviation authority.

■

STOCKHOLM — Demand for computer professionals has doubled in the past year, according to recently released figures from the Swedish Labor Market Board. Furthermore, despite laws requiring companies to report all job vacancies to the Board, it is generally held that many companies fail to do so.

ENGLAND

LONDON — British insurance giant Lloyd's of London has unveiled a $15 million computerization plan that spans 10 years. The basic elements of the system will be put into place from 1987 to 1988, according to a spokesman, and will link terminals in approximately 440 insurance offices with Lloyd's data center and central data bases.

The resulting network is likely to incorporate a combination of different network technologies to support a range of personal computers and terminals, a spokesman said.

A number of protocols are said to be vital to support Lloyd's current investment in equipment.

■

LONDON — Five multimicroprocessor systems have been added to International Computers Ltd.'s lineup of DRS 20 office workstations. The 100 Range systems are said to double the performance levels of the DRS 20 line, a spokesman said. The systems are based on Intel Corp.'s 8085 and 8086 microprocessors as well as on a workstation processor featuring 64K bytes of random-access memory.

Pricing on the office system line ranges from $2,890 to $14,145, according to the vendor.

WEST GERMANY

STUTTGART — The University of Stuttgart has joined forces with the Stuttgart System House Ikoss GmbH and Saab-Scandia. Ikoss/Saab will market Aska, the university's finite element method software system.

The software program is used for evaluating and optimizing design and building components primarily in aviation and flight simulation. Aska was used in developing the European Airbus Project, the Spacelab, the European carrier rocket *Ariane* and the American space shuttle. It is being called the alternative to the American Nastran system, according to a spokesman.

NEWS

CALENDAR

WEEK OF APRIL 14

APRIL 14-18, SAN FRANCISCO — **Conference on Human Factors in Computing Systems.** Contact: Donald Patterson, Lawrence Livermore National Laboratory, L-35, P.O. Box 808, Livermore, Calif. 94550.

APRIL 15-16, WASHINGTON, D.C. — **Successful Software Management.** Contact: Data Processing Management Association Educational Foundation Seminars, c/o Technical Training Corp., Department SCM, P.O. Box 3608, Torrance, Calif. 90510.

APRIL 15-16, ANAHEIM, CALIF. — **Software Configuration Management.** Contact: Data Processing Management Association Educational Foundation Seminars, c/o Technical Training Corp., Department SCM, P.O. Box 3608, Torrance, Calif. 90510.

APRIL 15-17, NEW YORK — **Workshop for the Newly Appointed Data Security Officer.** Contact: Marjorie Glazer, Computer Security Institute, 43 Boston Post Road, Northboro, Mass. 01532.

APRIL 15-17, WASHINGTON, D.C. — **Systems Network Architecture.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

APRIL 15-18, CHICAGO — **Data Base: A Builder's Guide.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

APRIL 15-18, WASHINGTON, D.C. — **Intelexpo '85.** Contact: U.S. Telecommunications Suppliers' Association, 333 N. Michigan Ave., Chicago, Ill. 60601.

APRIL 15-19, HOUSTON — **Structured Analysis and Design Techniques Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

APRIL 15-19, NEW YORK — **CICS Command-Level Programming.** Contact: Syscd, Inc., 35 W. 35th St., New York, N.Y. 10001.

APRIL 15-19, WASHINGTON, D.C. — **Knowledge Acquisition for Expert Systems: An Applications Perspective on Planning and Developing the Prototype.** Contact: M. James Naughton, Expert Knowledge Systems, Inc., 6313 Old Chesterbrook Road, McLean, Va. 22101.

APRIL 15-19, SAN DIEGO — **NCR Comten, Inc. User's Exchange Spring Conference.** Contact: Anne Madison, NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

APRIL 15-19, SAN FRANCISCO, — **CICS Internal Architecture.** Contact: Syscd, Inc., 35 W. 35th St., New York, N.Y. 10001.

APRIL 15-19, WASHINGTON, D.C. — **Managing Computer Professionals.** Contact: Compumetrics Training Institute, P.O. Box 58383, Houston, Texas 77258.

APRIL 16-17, DALLAS — **Advanced Lotus 1-2-3.** Contact: Professional Development Institute, North Texas State University, P.O. Box 13288, NT Station, Denton, Texas 76203.

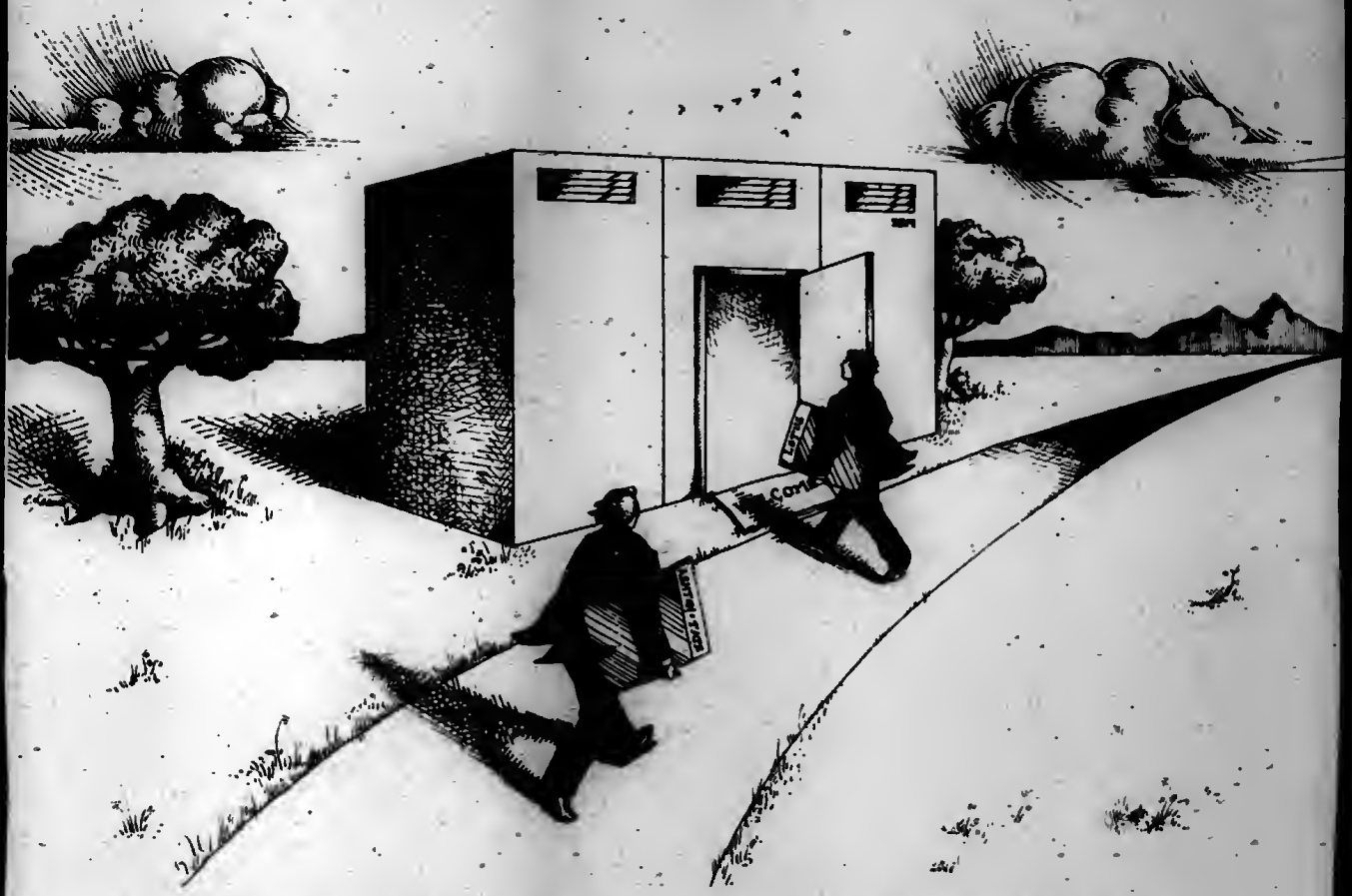
APRIL 16-18, ANAHEIM, CALIF. — **Computer-Integrated Manufacturing and Communications Industrial Software Conference and Exposition.** Contact: The Computer & Automated Systems Association of the Society of Manufacturing Engineers, Public Relations, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

APRIL 16-19, BOSTON — **Network Management/Technical Control Conference and Exposition.** Contact: Conference Management Group, CW Communications, Inc., P.O. Box 880, Framingham, Mass. 01701.

APRIL 17-18, NEW YORK — **New Opportunities in Management Information.** Contact: The Conference Board, Inc., P.O. Box 4026, Church Street Station, New York, N.Y. 10249.

See APRIL page 40

THE BEST MICRO-TO-MAINFRAME ROUTE IS ONE YOU TRAVEL EVERYDAY



If you're using the leading software packages from Lotus Development Corporation or Ashton-Tate, you're way ahead of the game in micro-to-mainframe access. Your next step is to add Lotus®/Answer™ or dBASE™/Answer™

Both programs let you select and extract any IBM mainframe-based information you need, in any format, for use with 1-2-3,™ Symphony,™ Framework,™ dBASE II® dBASE III™ and Friday.™

"This establishes Informatics line of Answer™ products as a de facto standard for tying these popular software packages to micro-to-mainframe communications." PC WEEK, July 24, 1984

Unlike many micro-to-mainframe links, Lotus/Answer and dBASE/Answer provide universal access to mainframe files. So you'll get all the vital, current and accurate information that you need most.

You don't have to be familiar with mainframe computers or communications to use Lotus/Answer or dBASE/Answer, either. Your own micro software experience is all it takes. Simple menus and extensive HELP screens are there to guide you smoothly along the way.

In addition to answering all your needs as a professional, Lotus/Answer and dBASE/Answer are also ideal for the data processing organization that controls them. They provide tight security at both the PC and mainframe levels. Processing and resource controls. And require little or no ongoing support.

Lotus/Answer and dBASE/Answer are part of The Answer Series, a family of products which give professionals easy access to mainframe data for a variety of reporting and analysis uses.

Why get detoured by other micro-to-mainframe links? With Lotus/Answer and dBASE/Answer, you're as good as there already. For more directions to the best micro-to-mainframe route, call Mary McGarry at (818) 716-1616, or send in the coupon today.

And Informatics can offer you more than micro-to-mainframe links. If you're a manager in a large corporation, government agency or in a business such as law, accounting or distribution, Informatics has software and services that can help you run your business better. **Informatics** general corporation

Please send literature and demonstration diskette.
☐ Lotus/Answer ☐ dBASE/Answer

Name _____

Title _____

Company _____ Phone ( ) _____

Address _____

City _____ State _____ Zip _____

Mail to: Mary McGarry, Informatics, The Answer Series, Marketing Department. P.O. Box 1452, Canoga Park, CA 91304.

The Answer Series™

APRIL from page 38

APRIL 17-24, HANNOVER, WEST GERMANY — **Hannover Fair '85.** Contact: Hannover Fairs Information Center, P.O. Box 338, Whitehouse, N.J. 08888.

APRIL 18-19, NEW YORK — **Security in the Electronic Office.** Contact: Computer Security Institute, 43 Boston Post Road, Northborough, Mass. 01532.

APRIL 20-25, ORLANDO, FLA. — **Bis/Cobol Users Group Annual Meeting.** Contact: Marshall O'Neil, P.O. Box 12424, Jackson, Miss. 39211.

WEEK OF APRIL 21

APRIL 21-24, NASHVILLE — **The 1985 Annual Conference of the Association for Systems Management.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

APRIL 22-23, WASHINGTON, D.C. — **How to Manage Data and Information as Resources.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

APRIL 22-23, BALTIMORE — **Structuring & Negotiating Hardware Contracts, Software Contracts and DP Service Contracts.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held April 29-30 in Chicago.

APRIL 22-23, CHICAGO — **Data Communications and Networking for the IBM Personal Computer and Other Personal Computers.** Contact: Dorothy Daly Marshall, Digital Consulting Associates, Inc., 6 Windsor St., Andover, Mass. 01810.

APRIL 22-24, WASHINGTON, D.C. — **Protocols for Message Handling Systems.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

APRIL 22-24, LOS ANGELES — **Data Base: A Manager's Guide.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402. Also being held June 3-5 in Toronto.

APRIL 22-24, NEW YORK — **Speech Tech '85 Voice Input/Output Applications Show.** Contact: Media Dimensions, Inc., P.O. Box 1121, Gracie Station, New York, N.Y. 10028.

APRIL 22-25, CHICAGO — **CICS Applications Design.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

APRIL 22-25, WASHINGTON, D.C. — **National Conference on Decision Support Systems.** Contact: Conference Manager, U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903.

APRIL 22-25, SAN FRANCISCO — **The International Conference on Information Management.** Contact: The Institute for Information Management, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

APRIL 22-26, WASHINGTON, D.C. — **Design of Computer Operating Systems: Concepts and Principles.** Contact: George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

APRIL 22-26, NEW YORK — **Data Base Development Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

APRIL 22-26, NEW YORK — **MVS JCL.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

APRIL 23, BOSTON — **Seminar on Data Communications.** Contact: Bill Hopkins, Simware, Inc., 14 Concourse Gate, Nepean, Ontario, Canada K2E 7S6. Also being held April 24 in New York and April 25 in Washington, D.C.

APRIL 23-25, NEW YORK — **Teleprocessing Fundamentals.** Contact: Amdahl Corp., National Education Center, M/S 302, P.O. Box 3470, 1250 E. Arques Ave., Sunnyvale, Calif. 94088.

APRIL 23-25, LOS ANGELES — **Effective Management Techniques For Data Processing Managers and Project Leaders.** Contact: Abbott, Galvani Associates, 1850 Union St., San Francisco, Calif. 94123.

APRIL 24-26, BOSTON — **Data Communications Systems & Networks.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

APRIL 24-26, BOSTON — **Local-Area Networks.** Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held April 29-May 1 in San Francisco.

APRIL 24-26, WASHINGTON, D.C. — **MVS Internals.** Contact: Acts Corp., 11910 Gate Way, Austin, Texas 78727. Also being held May 8-10 in St. Louis and June 5-7 in Houston.

APRIL 24-26, WASHINGTON, D.C. — **Computer Graphics for Business.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

APRIL 27-28, NEW YORK — **CICS Command-Level Intensive.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

APRIL 24-26, BOSTON — **X.25 and Packet-Switching Networks.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

APRIL 24-26, WASHINGTON, D.C. — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

APRIL 24-26, SAN FRANCISCO — **Unix Systems Expo '85 — Spring.** Contact: David Small, Computer Faire, Inc., 181 Wells Ave., Newton, Mass. 02159.

APRIL 25-26, WASHINGTON, D.C. — **Dbase III: Its Techniques and Its Applications.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

The full-time computer for part-time users

Not everyone who needs a personal computer in your company needs one full time. That's why full-function COMPAQ portable computers give you more for your money than most desktop computers. They're built tough enough to share.

In a single day, your research department can use a COMPAQ portable to access information, accounting can borrow it to track receivables, and marketing can take it to make sales forecasts. Everyone can use it under "safety" conditions to take home at no risk to you.

COMPAQ's unique cross-functional software lineup, which supports Lotus 1-2-3 and other most needed tools like word processing, lets it withstand the

[illegible] computer. [illegible] PC and XT, offer [illegible] and provides an [illegible] to [illegible]

[illegible] Easy outlasts the IBM Portable Computer in every [illegible] by [illegible].

[illegible] should have

EDITORIAL

MIS curricula falling behind

An MIS degree based on skills that can be as much as five years out of date is probably better than no college degree at all. But how much better?

In a time when information executives are fighting a daily battle to keep their technicians and project managers up to date on new technologies, there may be a time lag of up to five years in the implementation of changes in MIS requirements in the curricula for today's MIS students [CW, March 11].

Big deal, you say. Five years isn't that long.

But try to remember what information processing was like in the corporate arena back in 1980, and you can comprehend the usefulness of an MIS degree based on five-year-old requirements:

■ IBM had not announced its Personal Computer and legitimized the corporate microcomputer. Until Big Blue put the seal of approval on microcomputing with its August 1981 announcement, most MIS departments simply ignored the possible impact of micros on their own personnel and in user departments. Corporate information centers did not exist.

■ AT&T was still Ma Bell. The modified judgment that resulted in the AT&T divestiture took place in January 1982, and the telecommunications explosion had not yet occurred.

■ The U.S. v. IBM antitrust suit was in full swing. It would be another two years before the U.S. Department of Justice would drop its charges and the full weight of an unleashed IBM would hit competitors on all fronts.

■ Japanese firms were investing heavily in expanded semiconductor plant facilities to advance 256K-bit chips from the laboratory to commercial production. These chips made their appearance in commercially available micros more than one year ago, and AT&T, IBM and others are now concentrating on bringing a 1M-byte chip to market.

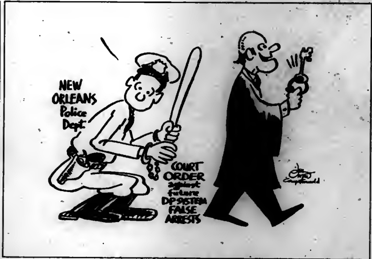
More examples are readily available, but the message is clear: Five-year-old technological expertise is highly suspect in a field where change is the norm and obsolescence must be shunned like the plague for companies to remain competitive.

What MIS departments need is a pool of graduates who are at the forefront of information systems concepts and technologies. The graduates they are getting come from institutions like Stanford (Calif.) University Business School — a school that can only afford to teach graduate students "basic computer literacy" and that turns down personal computer donations because there is no space or staff to teach students how to use them — or institutions like California Polytechnic State University, where today's curriculum changes won't get into the curriculum catalog until 1986, or the University of Minnesota, where one professor acknowledged that the school has failed to recognize changes in the MIS "real world."

Reasons for the inability of many schools to provide their MIS graduates with up-to-date skills and knowledge range from administrative lassitude, through lack of space and funds, to their inability to compete effectively with the industry in terms of salary for qualified candidates who can teach at a state-of-the-art level.

These may be sufficient reasons, but they are not excuses. The commercial and academic sectors must work together to solve the problem of too few qualified professors teaching outdated techniques and technology to ensure the industry's success.

Five years can be a very long time.



'An ounce of prevention is worth a pound of cure.'

LETTERS

Esperanto: Ideal for translations

I would like to respond to the article "Ancient language may prove key to translation system" [CW, Feb. 25] on the use of the ancient Indian language Aymara in multilingual translation. Not mentioned in the article is the similar use of another logical language, Esperanto. Europeans are working on language translation using Esperanto as an intermediate language. Esperanto is a logical language; it is being used as an international language by several million people worldwide, and it is easy to learn.

It is interesting to learn that a natural language, such as Aymara, has some logical features, but Esperanto should be investigated because it is much more accessible and already in use. People should consider it in deciding which to use as a universal intermediate language for translations.

Fred Feldvary
Berkeley, Calif.

Software group membership urged

The column "Keeping maintenance minimal" [CW, Feb. 4] suggested that managers, to maintain and to extend existing systems, should converse with other managers, form a special interest group and read about what other companies are doing.

I would recommend joining the Software Maintenance Association, a new independent group concerned with the enhancement, adaptation and correction of computer systems and programs.

Nicholas Zvegintzov
Staten Island, N.Y.

COMPUTERWORLD

Donald E. Fagan
Publisher

Editor	Executive Editor	Managing Editor	Asst. Managing Editor
John C. Whitmarsh	Rita Shoor	Bill Laberis	Donovan White

Senior Editors: Software John Gallant; Microcomputers Eric Bender; Communications John Dix; Systems Tom Henkel; Industry Peter Bartolik; Features George Harrar; Design Editor Marjorie Magowan; Special Projects Editor James Connolly; Update Editor Glenn Rifkin; Director - International News Services Susan Blakeney; Associate Features Editor Barbara Van Scoyoc; Asst. Features Editor Elizabeth Moree

Special Reports Editor Janet Fiderio; Asst. Special Reports Editor Becky Batcha; Senior Writer: Paul Korzeniowski; Staff Writers: John Desmond, Maura McEnaney, Donna Raimondi, Edward Warner; Correspondents: New York Correspondent: Charles Babcock, Paramus Plaza I, 140 Route 17 N., Paramus, N.J. 07652, 201/967-1350; Washington, D.C. Senior Correspondent: Bryan Wilkins; Correspondent: Mitch Betts, 1273 National Press Bldg., 529 14th St., N.W., Washington, D.C. 20045, 202/347-6718

West Coast Bureau Chief: Jeffry Beeler; Correspondents: Kathleen Burton, Kathleen Sullivan, 1060 Marsh Rd., Menlo Park, Calif. 94025, 415/328-8084; Chief Copy Editor Charlotte Zarris; Asst. Chief Copy Editor Lory Zottola; Copy Editors: Christina Cassidy, Deborah Fickling, Patricia Hasl, Penny Jansen, Kelly Shea, Joseph Stalvey, Barbara Sutton, Kimberly Valloch

Asst. to the Editor June Fettig; Editorial Assistants: Lorraine Brien, Patricia Faherty, Nancy Shannon, Cheryl Tynan; Contributors: Human Connection Jack Stone; Testament Time Larry Long; Micro Update Thomas Madron; The Data Center John P. Murray; Lecht on Software Charles P. Lecht; Management Slants Walter F. Cullis; Special Publications Computerworld Extra! George Harrar, Editor; Computerworld Focus Ann Dooley, Editorial Director

Main Editorial Offices: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 57 computer publications in more than 20 major countries. [illegible]

VIEWPOINT

Graphics harmonizes worlds of art, science

LECHT ON SCIENCE
Charles P. Lecht

It hasn't escaped anyone's attention that the same advanced supercomputer systems mathematicians and physicists need to perform their work are also fantastic picture-making machines — and they move to boot! That's why new film productions are vying for supercomputer time — once considered applicable only to math and physics uses, such as weather prediction, energy production and space travel. The tide of new graphics offerings for all ranges of computer systems is on the rise, and there is beauty and drama in this. The arts and sciences meet on the field of computer-generated graphics to create images of our material and ideological realities, and the payoff is promising.

I always thought it strange that people didn't hoot and holler more about how fortunate we are to be able to generate pictures with computers. The younger generation takes it for granted as just another ho-hum means of drawing, as if it were like a paper and pencil. Even older people, especially those with a lot of television time behind them, seem to have taken its innovation as just another event in an endless stream of electronics that has flowed for some 30 years now.

The sudden appearance of programmable video graphics for all-size systems and its ever-increasing applications on television sets and movie screens seems not to have been recognized as something really special, but this will rapidly change.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

Today's graphics "happening" is as important an event as the birth of the digital computer. Its impact will be monumental; with pictures and movies easy to create, we can expect a dramatic increase in their use.

Graphics systems that can store digitized photographs and create photographic-quality reproductions so that the pictures don't always need to be drawn — while allowing the mixture of text with both — generates the material production power of a Walt Disney studio suddenly collapsed into a desktop box. Who would doubt that pictures will soon replace a lot of words in our day-to-day communications and that the words that remain will be greatly clarified?

Prelude to holographic projection

It doesn't take too much imagination to envision today's graphics achievements as a prelude to holographic projection. Holography allows us to create visible graphics etched in otherwise invisible space through the energy released when photons — organized and hurled at each other by powerful laser guns — collide at incredible speeds. The reissued version of the subject we wish to etch — controlled by processors with vast memories containing a pointillistic image of the subject's animation — can appear so real that our senses may tell us the etching has a physical presence. Although plenty of conclusive evidence attests that holography is possible, obvious technological and/or financial constraints have inhibited its development.

Today's graphics environments on computer systems from micro to mainframe and beyond prove, without a doubt, that the benefits of using holography as a practical tool are immense. Think of the benefits the capability to create holograms might yield to information processing, military, education and entertainment industries.

As our leading researchers experiment to improve computer systems performance so that holography might become possible, they work at the frontier of computer and communications science. Here, any kind of picture — however vague it is on what it pretends to show — doubles its value. Pictures of the frontier of our subatomic world are in short supply, and all of them are drawings.

As we go deeper into the structure of matter, previously unseeable objects and processes come into focus. And as they do, the meaning of vision changes to "understanding." The only thing we can hope to see is a scientist's artistic rendition of his understanding in the form of a diagram or chart, if not a mathematical formulation. "Picturing" the realm of the atom and yet further into its electrons, protons and neutrons makes the scientist an artist; his medium is video graphics. Casting the artist as scientist as he experiments with the new media, too, is almost too coincidental.

Images of Seurat and his medium

This conjures for me an image of the entire supercomputing community on a Sunday afternoon in a park with the impressionist painter Georges Seurat and all the pointillist portraits of our universe. Reducing the size of their brush points to out-of-sight proportions where a trillionth is large, they vigorously create ever-new pictures of what is "out there" — or "in there," according to your viewpoint.

Seurat's desire to reproduce what he saw in basic, irreducible points is beautifully paralleled by the work of our supercomputer community. We should not be too upset if an irreducible particle of which all matter is composed is discovered. The world didn't collapse when we discovered other such limits, such as the speeds of light and sound. We could use it as a common "point" with which to paint portraits of all things visible and create models of those things invisible.

See GRAPHICS page 44

Leading firms notice, cultivate staff loyalty

HUMAN CONNECTION
Jack Stone

Certainly when compared with other operating departments of business and government organizations, the information systems department is perceived as a hotbed of innovation, home of a horde of freethinking high-tech people who thrive on extremely complex processing problems.

As most DP managers have learned through years of hard knocks in the business, getting the job done requires some semblance of order and a corralling of the strivers, such as the work performed by mature veteran analysts — people who have been in the organization a number of years and bring a certain stability and continuity to the development environment.

In a March 3 article in the *Washington Post*, Jeanne Dorin McDowell listed some novel and surprising observations about the effectiveness of certain long-term employees:

"Management psychologists and . . . corporate executives are starting to recognize that loyalty can be highly overrated. They increasingly view the company soldier who blindly follows orders year after year as dull, dependent and a drag on corporate dynamism. . . . The compliantly loyal individual simply cannot contribute much in a business environment characterized by . . . rapid-fire changes in technology. . . . Instead, many chief executives seek underlings who may be short in commitment but long in talent and [their] willingness to take risks."

If this situation is an indication of a growing trend of things to come, senior DP managers have some serious rethinking ahead. After having struggled for years with high turnover rates and the loss of professional employees who are knowledgeable about the detailed operations of the business and after trying desperately to institutionalize a DP organization to set some form of control, DP managers — if they embraced McDowell's philosophy — would have to assume their efforts were in vain and that presumed gains in supervisory effectiveness through employment longevity would be countered by losses in technical leadership.

> ❞
>
> *I would judge that the loyal, steady and dependable individual in the DP center, on the average, is much more of a potential asset than a liability. I would search for stability at the possible risk of falling behind in the technology game.*

McDowell is a bit too far on the radical side of the issue; the truth of the matter lies in a somewhat more moderate view. I would judge that the loyal, steady and dependable individual in the DP center, on the average, is much more of a potential asset than a liability. I would search for stability at the possible risk of falling behind in the technology game.

McDowell brought up the related question of the degree of pervasiveness of loyalty in today's business world. McDowell suggested that "loyal employees are a vanishing breed," citing the psychological devastation created by the recent recession, the general thrust in American organizations to slim and trim the work force and the broadly based uncertainty created by the corporate "takeover" movement.

I don't fully agree with her conclusions on this matter — not in our industry, at any rate. We have many organizations — IBM and Hewlett-Packard Co., for example — that have worldwide reputations for loyal personnel who stick to the firm in spite of business adversity. Among the reasons these firms have been successful in this regard is that they reward the staff, in part, for their technological leadership and achievement.

But even more important, employees enjoy working for such leading companies because these firms are successful — highly so and in many dimensions — in the international marketplace, in technology development and, most significantly, in their fair and sensitive treatment of the employees. ‡

Stone is a Washington, D.C.-based independent management consultant, educator and writer, specializing in DP human communications and personnel development.

VIEWPOINT

People's attitudes can make or break DP security plan

READER'S PLATFORM
Matthew E. Murphy

Data processing security plans often fail to focus on the real key to their success — people. Without the support of the people within your organization, technological devices ultimately will fail. Emphasize the role people play, not the security provided by locks, buzzers and vaults.

People's attitudes will make or break a corporation's security plan. But because corporate policy directives governing security are punitive in nature, an individual must think long and hard before believing that a violation is anything but harmless. Because of these circumstances, a person does not feel responsible for anyone else's behavior but his own.

One way to go from a win/lose to a win/win situation is through logical, comprehensive security checklists, which respect the human side of security and recognize the predisposition to give people the benefit of the doubt. As a case in point, let's look at how people answer security checklist questions and how we can reword these questions to avoid the problem. Consider the following question:

■ **Are production data sets password-protected?**

A person answering this question who thought that 99.9% of the data sets were protected would feel comfortable answering "yes" because he would think a "no" answer would cast a black mark against someone else. He would think the preponderance of evidence requires a "yes" answer.

The same question could be reworded as follows:

■ **Are *all* production libraries password-protected?**

I suspect the same person who would answer "yes" to the first question would feel quite different about the second question. That person would be more inclined to arrive at the truth of the matter and correctly answer "no."

Key words such as "all" and "every" in each question on the checklist help avoid the trap inherent in this example. You yourself may be asking what difference it would make if only a few data sets were not password-protected. The difference could be disastrous. The difference could be that the *only* data set of thousands not protected could be the password data set itself.

Perhaps the best way to question people about security is not to force them to check answer boxes but allow them to use their own words. End your questionnaires with something like, "Are there any areas where security is lax or violated? Are there any suggestions you have?"

Other security issues to be considered from a human point of view include the following:

■ **Who has ownership of all security matters?** If the janitor has ownership for physical security, then you will get janitorial service. If a senior vice-president has ownership, then you will get senior vice-presidential service.

■ **What is the loss incurred if security is violated?** Make sure the loss, punishment and security are balanced in the eyes of those who work for you. Ask them to help set up this balance. If their jobs are hampered by an imbalance in this equation, people will violate security *in order to do their jobs.*

■ **Who audits the security plan?** Internal and external auditors typically audit the security plan, but they are the least likely to uncover violations after the fact and loopholes before the fact. The most successful test programs assign teams to try to break security. Think of it — an audit that uncovers weakness before it is exploited by someone not on your side. Security shortfalls are best pointed out by those who work closely with the systems at hand. Security loopholes need incentive programs to reward individuals who find them.

■ **Look for security problems in unlikely places.** Does the holder of a vendor identification card automatically exempt that person from all other security checks? Are DP software security packages verified by those who work closely with the systems for which they are supposed to provide security? How good is your DP password system? Are security systems in place by default?

Putting your emphasis on people will make your security efforts pay off. ‡

Murphy is manager of information management services at Arthur Young & Co.

GRAPHICS from page 43

Think of a world where the arts consume as much of our attention as science does; where theater, music, painting and sculpture become ever-closer companions — the latter two playable on keyboards, as music is, and with all three possessing the potential of instant transformation to one another. A world where these become ingredients in a new medium with which reality may be produced and/or reproduced is like Sunday in the park with George.

SOFTWARE & SERVICES

Links pose several challenges for MIS

By Maura McEnaney
CW Staff

FRAMINGHAM, Mass. — Meeting high end-user expectations and selecting from the wide variety of expensive micro-mainframe communications products are among the greatest challenges facing MIS directors today, according to a recent report on micro-mainframe links from International Data Corp. (IDC), a Framingham, Mass., market research firm.

To meet the challenge posed by micro-to-mainframe links, MIS managers must identify the end user's functional requirements, conduct careful product analyses and consider growing user demands for such link services when reviewing capacity-planning policies, stated the report, "Micro-Mainframe Communications: Boon or Boondoggle?"

Prepared by IDC's Information Systems Planning Service, the report included preliminary results from the firm's annual user survey. The survey found that 36% of IBM mainframe sites employed some type of micro-mainframe communications software. The results are based on the first 155 responses to IDC's November survey of 13,000 MIS managers nationwide.

MIS managers responding to the survey predicted substantial micro growth within their companies. They said personal computer installations at their companies will increase 70% this year, and they expected that a greater number of those machines will soon be tied to the mainframe.

Last year, 68% of managers surveyed by IDC said that between 81% and 100% of the personal computers in use within their organizations operated as stand-alone units. This year, only 30% of the respondents said that a similar percentage of the micros operated as stand-alone units.

According to IDC, the growth of micro-mainframe links within corporations has been somewhat hampered by a lack of communications between MIS and end users. As a result, MIS managers must concentrate on what IDC identified as eight critical micro-mainframe issues. An expected increase in transaction volume and threats to data integrity arising from micro-mainframe connections make security the MIS manager's top priority, the IDC report said.

"[DP professionals] must be concerned that the large number of new users will cause management nightmares," the report said. Encouraging end users to automate business efforts, assisting with micro systems analysis and providing guidance in security and data recovery procedures will help reduce the security risk, the IDC report said.

Other issues raised by micro-mainframe links, according to IDC, are the allocation of personnel to provide end-user support and product evaluation, data administra-

See REPORT page 54

■ A multilingual word processing package is helping translators in industry and academia break down language barriers/46

■ Inference Corp. introduced a software tool designed to aid in the construction of expert systems/46

■ Quantitative Software Management announced a service geared to improving the software development life cycle/50

INSIDE

SOFTALK/JOHN DESMOND

MVS — to upgrade or not: DOS users still suspicious

You can lead a DOS user to water, but you can't make him drink.

Recent IBM software announcements concentrating on VM and MVS/XA [CW, Feb. 18] clearly indicate the product to which IBM is committing its resources in the operating systems arena. Price incentives such as six months of MVS/XA free for any non-MVS user who converts and statements of direction advising growing DOS shops to convert to MVS make it plain where IBM wants its DOS users to move.

But not all DOS users want to move, and some don't appreciate the pressure being put on them. John Ernst, DP director at the Southeast Wisconsin Regional Planning Commission said, "They force you to make an upgrade when you get to a certain machine." Ernst runs a 4381 Model 1 with DOS/VSE under VM. He needs more room and IBM salesmen have advised him against running DOS/VSE on a bigger 4381

See DOS page 54

SOFTLINE
Thomas O'Flaherty

Software not Japan's forte?

A continuing puzzle to Westerners, and apparently to the Japanese themselves, is the contrast between the enormous success of the Japanese in the manufacturing and electronics industries — including, to a lesser degree, the computer industry — and their failure to become a factor in the production and sale of packaged software.

Is this just a temporary situation that will soon be remedied, perhaps as part of Japan's fifth-generation computing exercise? Or is it a more deeply rooted problem that will take

See JAPAN page 51

O'Flaherty is a principal at Information Service Strategies in Hackensack, N.J., and a regular contributor to Softline.

Pick operating system rewritten with future enhancements in mind

IRVINE, Calif. — Pick Systems has introduced what a spokesman labeled as a completely rewritten version of the portable, multiuser Pick operating system.

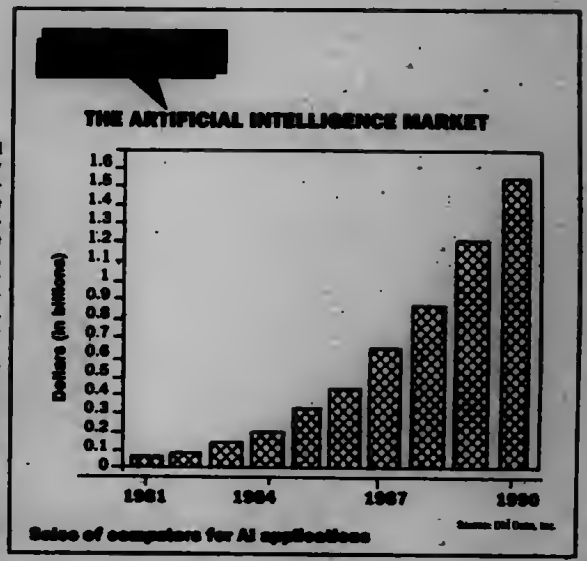
According to the spokesman, the Open Architecture version of Pick was designed to allow Pick Systems to add more easily new functions, such as better communications support, in the future. The restructured version was described as a new foundation upon which such future enhancements can be based. Open Architecture is completely compatible with the previous version of Pick — known as R83 — and provides for applications portability with all the previous implementations of the operating system, he said.

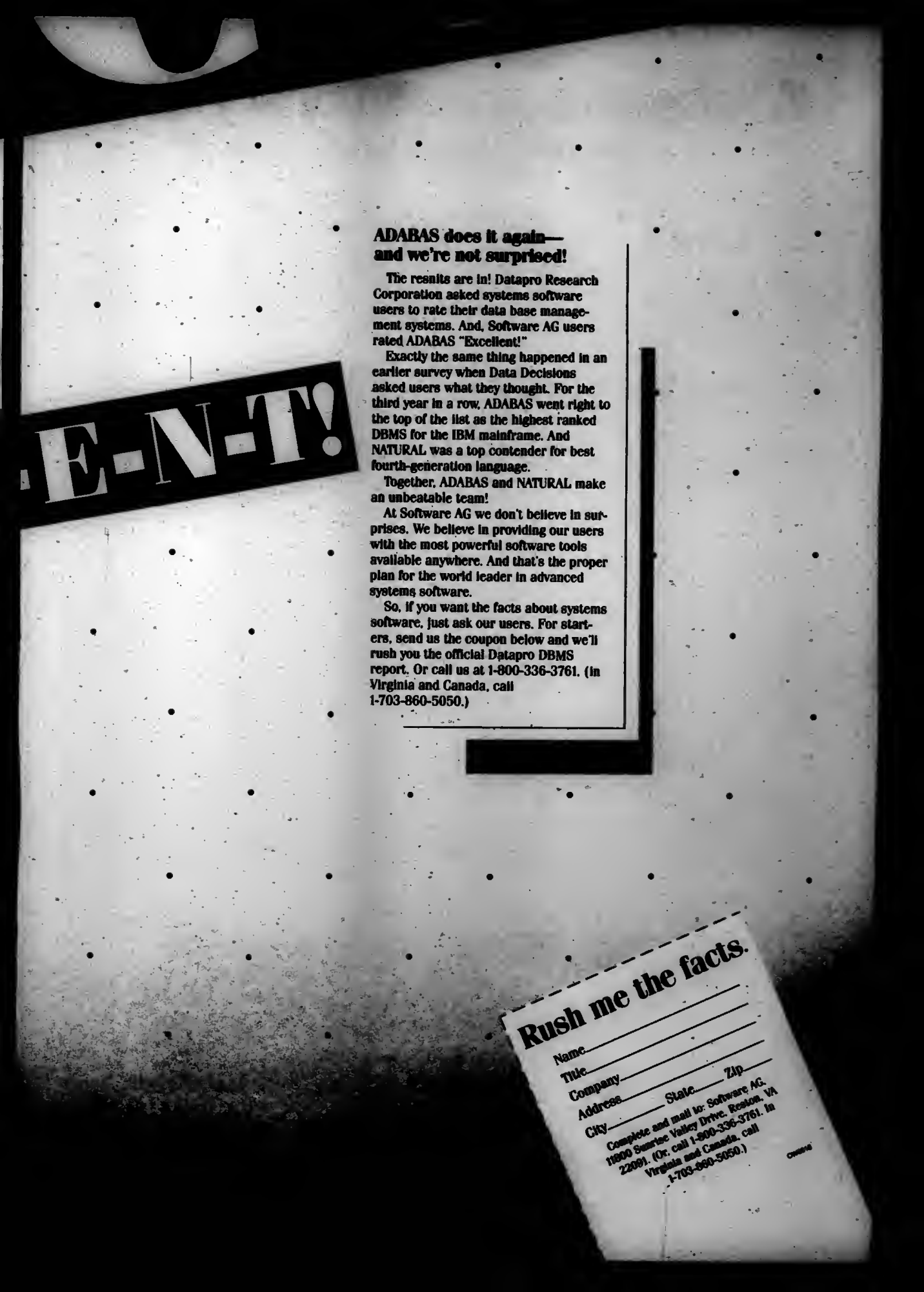
In addition, Open Architecture offers features not contained in R83, including multitasking capabilities, performance enhancements and support for unlimited record sizes. The spokesman said that the system's multitasking ability allows a user to run more than one program at the same time from the same terminal. It also enables a user to execute operating system commands while working within an application program, without exiting that program. Open Architecture's Level Pushing feature, similar to windowing capabilities, allows a user to switch between two or more processes or programs.

Open Architecture is said to feature roughly 30% faster throughput than R83. While the R83 version of Pick provided for a maximum record size of 32K bytes, Open Architecture's record size support is limited only by the storage capacity of the host hardware.

Pick is a multiuser, machine-independent operating system with a built-in data base management system. It is sup-

See PICK page 54




-E-N-T!
ADABAS does it again—
and we're not surprised!
The results are in! Datapro Research Corporation asked systems software users to rate their data base management systems. And, Software AG users rated ADABAS "Excellent!"
Exactly the same thing happened in an earlier survey when Data Decisions asked users what they thought. For the third year in a row, ADABAS went right to the top of the list as the highest ranked DBMS for the IBM mainframe. And NATURAL was a top contender for best fourth-generation language.
Together, ADABAS and NATURAL make an unbeatable team!
At Software AG we don't believe in surprises. We believe in providing our users with the most powerful software tools available anywhere. And that's the proper plan for the world leader in advanced systems software.
So, if you want the facts about systems software, just ask our users. For starters, send us the coupon below and we'll rush you the official Datapro DBMS report. Or call us at 1-800-336-3761. (In Virginia and Canada, call 1-703-860-5050.)
Rush me the facts.
Name
Title
Company
Address
City State Zip
Complete and mail to: Software AG, 11800 Sunrise Valley Drive, Reston, VA 22091. (Or, call 1-800-336-3761. In Virginia and Canada, call 1-703-860-5050.)

What makes a revolutionary idea revolutionary?

Before the Dark Ages could completely darken, man invented the wheel. Took everybody by surprise too, just like STEAMER.

First, it has to be new. Really new. STEAMER is new. Brand new. It's an extremely powerful data compressor combined with a very efficient statistical multiplexer. And it's about to set the data communications industry on its ear.

Our data compression ratio is better than anyone else's.

Nobody but nobody can produce better data compression efficiencies than we can with STEAMER. By using advanced statistical multiplexing techniques which yield statistical efficiencies of about 8 to 1, and passing the statistically multiplexed data through a proprietary algorithm, we get data compression efficiencies averaging 2.2:1 to 3.2:1.

That's significantly higher than anyone else. And it means increased throughput and operating efficiency for you. Columbus may have changed the way people thought about the shape of the world. But we're changing the way the world thinks about data compression.

Columbus may have changed the way people thought about the shape of the world. But we've changed the way the world thinks about data compression.

Proprietary compression algorithm: the heart of the matter.

Our proprietary compression algorithm continually analyzes the incoming data stream on a port-by-port basis and compresses the most frequent strings into shorter strings. If the '48 Beetle taught people to think small, we're teaching them to think short.

Because the type and volume of data transmitted on a typical port in one direction on a link may be very different from the data transmitted in the other direction, or on other ports, STEAMER analyzes the data in each direction on a port-by-port basis and builds entirely independent compression tables. That ensures that maximum compression efficiency is obtained.

The '48 Beetle taught people to think small. We're teaching people to think STEAMER.

In fact, the STEAMER compression routine is so efficient, it virtually guarantees no additional delay added to response time. Our compression algorithm can compress or decompress 3,000 characters per second. That's the equivalent of a 14,400 BPS circuit operating at an 83% saturation rate in both directions simultaneously!

We compress the uncompressable.

They said it couldn't be done. But we did it. In some graphics applications we got better than a 2:1 data compression ratio. We can even compress object code files. Which means that in addition to being an outstanding choice to ensure exceptional throughput and operating efficiencies, the STEAMER is really the *only* machine that can do all of the following: remote file transfer, some graphics applications, computer to computer and computer to terminal communications on the same link, maintain system throughput even when modems must operate in fall back mode because of line degradation, increase terminal quantity without scrapping the current modem investment, and relatively secure communications without the necessity of buying expensive encryption equipment.

The STEAMER is doing to all other data compression machines what the easy open pull top can did to can openers. Make 'em obsolete.

Revolutionize your network today.

Call **1-800-235-5030** now and we'll tell you even more about STEAMER. And don't wait. STEAMER'S going to do to all other stat muxes and data compression machines what the easy open pull top can did to can openers. Make 'em obsolete.

On March 4, 1985 Datagram revolutionized the data communications industry with STEAMER.

Datagram

We make networks work harder.

USA-DATAGRAM, 11 MAIN STREET, EAST GREENWICH, RHODE ISLAND 02818 CANADA-INTERNATIONAL DATAGRAM, INC., 1451 GRANDE ALLEE, BOUCHERVILLE, QUEBEC, CANADA J4B 6A1
BRANCH OFFICES IN MAJOR CITIES.

Multilingual software helping break language barrier

By Donna Raimondi
CW Staff

Translators — working to break down language barriers between people and machines — are being aided by multilingual word processing software.

Staff and free-lance translators employed by Berlitz Translation Services in New York are using the multilingual word processing package to localize software for use in foreign countries and to translate user manuals for multinational corporations, said David S. Laube, Northeast sales director for the Berlitz office, one of seven nationwide Berlitz translation centers. The linguists also perform such routine tasks as translating company contracts for foreign affiliates and converting advertising copy and brochures into a variety of languages for their clients.

At Berlitz, a typical linguist's set-up includes a Digital Equipment Corp. Microvax with Data General Corp. terminals and keyboards and a Toshiba Corp. dot matrix printer, Laube said. Berlitz uses the ML*WP package from Compulex, Inc. of Lowell, Mass. to perform language translations from English into Russian, Spanish, French and Hebrew and from those languages into English, he said.

In addition to its business applications within Berlitz, the multilingual package is making its mark in academia. Since the fall of 1984, Prof. Robert Szulkin of Brandeis University in Waltham, Mass., has been using the ML*WP system to translate medieval Russian text into modern Russian and English for his students.

"Before, I would write out translations in longhand, then type a first version and then correct it two or three times before doing a final draft," Szulkin said. With the word processing package, he types his translations — for example, from medieval Russian into modern Russian and English — directly into the system, he said.

Language switch with tap of key

The program allows a user to switch from one language to another with the tap of a key, he said. English is the base language on Szulkin's system, in which Help screens and commands are written, but the base language can be changed by the software company to Russian or any other language the user chooses, he said.

The program works with languages written right to left, such as Arabic or Hebrew, as well as languages written left to right, he said. Szulkin's version of the program supports 18 languages, but it is capable of being configured to support as many as 192 languages. He currently runs the word processing package on a DEC Microvax with 1M byte of memory.

Szulkin is currently translating line by line a 12th-century Russian epic poem, "The Song of Igor," into modern Russian and English. He will later add explanatory notes and glossaries with the help of the software.

The resulting text will allow students to focus on the artistic, rather than linguistic, qualities of the literature. "We can concentrate more on the essence of the text rather than spending time on linguistic problems," he said.

Development tool debuts

LOS ANGELES — Inference Corp. has announced the Automated Reasoning Tool (ART) for expert system software development. The product runs on Symbolics, Inc. and Lisp Machines, Inc. workstations and other processors supporting the Lisp programming language.

A spokesman said ART enables programmers to develop commercial expert systems for applications that include resource scheduling, manufacturing planning, aerospace systems, financial planning and military command and control. Features of the system include backward-chaining capabilities, user interface graphics, such as windows and icons and a knowledge-based graphics editor.

The product is offered in two versions: ART and ART/LV. ART/LV is a development environment that supports artificial intelligence techniques such as pattern matching, forward-chaining based on facts, backward-chaining in response to goals, logic programming and production rule transformational programming. ART/LV's knowledge representation capabilities allow a programmer to describe an array of facts and relationships. Its rule compiler allows it to be used for real-time data analysis and decision making.

ART is an extended version of ART/LV that adds a Viewpoint feature, which enables a programmer to compare multiple alternatives simultaneously to select an optimum solution. Viewpoint also allows ART to handle time-modeling and logic-programming tasks.

ART is priced at $85,000 and ART/LV is priced at $60,000.

Inference is located at 5300 W. Century Blvd., 3rd Floor, Los Angeles, Calif. 90045.

QSM offers assessment service

MCLEAN, Va. — Quantitative Software Management, Inc. (QSM) has introduced a service for evaluating software development environments.

QSM's Software Engineering Assessment Service (Seas) reportedly utilizes software metrics, environmental analysis and graphical industry comparisons to aid in the analysis of an organization's software development costs, problem areas, potential productivity enhancements and return on investment, a spokesman said.

A Seas questionnaire collects data on an organization's completed and in-process software development projects. Questionnaires are reviewed by QSM, and interviews are then held to explore further the organization's development operations. QSM then presents a formal report documenting its findings and recommendations.

Seas is priced from $10,000 to $55,000, depending on the size of the organization.

QSM is located at 1057 Waverley Way, McLean, Va. 22101.

SYSTEMS SOFTWARE

■ **National Information Systems, Inc. has announced a new pricing structure for its Teleport II micro-to-mainframe connection.**

Teleport II facilitates communications between Digital Equipment Corp. Decsystem-10, Decsystem-20 and VAX series under VMS; Fortune Systems Corp. Model 32:16; DEC Rainbow; IBM Personal Computer, Personal Computer XT and compatibles; Apple Computer, Inc. Apple II and Apple IIe; and Tandy Corp. Models 2, 3, 4, 12 and 16 computers.

Previously, the software was sold bundled for one mainframe and five micros; it is now available on an individual license basis.

Prices range from $250 for a single microcomputer license to $4,000 for a mainframe license.

National Information Systems, Suite 130, 20370 Town Center Lane, Cupertino, Calif. 95014.

■ **Software Pursuits, Inc. has introduced a spooling system and Procedure Language Facility (PLF) for users of IBM's DOS/VSE operating system.**

According to a spokesman, the Spri Spooling System can be used in place of IBM's VSE/Power spooler. The spooler allows reports to be selected for printing in any sequence and at any time from a variety of report attributes, including form number, report name, department name, customer name and job number. Reports can be automatically routed to multiple locations without any operator intervention and printed simultaneously.

Reports spooled to IBM's VM operating system may be automatically routed to IBM's Remote Spooling Communications Subsystem destinations or printed on local printers. Spri does not require priority over any online systems and provides Remote Job Entry support. Spri is priced at $300/mo.

The spokesman said PLF is a preprocessor that allows automatic updating of IBM's JCL. PLF can be used to branch backward or forward within JCL streams, restart systems without operator intervention, control routine updates and insert data. PLF can be leased for $200/mo.

Software Pursuits, Suite 800, 444 Market St., San Francisco, Calif. 94111.

■ **Data General Corp. has announced a nearly 70% price reduction on the Ada Development Environment (ADE) for its 32-bit computer systems. The company also announced that ADE is now supported on DG's cluster systems.**

An ADE license for DG's MV/10000 SX, MV/10000, MV/8000 II, MV/8000C and MV/4000 systems is priced at $28,000. An ADE license includes an Ada language compiler, program development tools, installation and documentation. An additional ADE extension, which includes a source debugger and a configuration control system, is priced at $9,000 for

Continued on page 82

JAPAN from page 45

much longer to overcome?

The term "packaged software" refers mainly to applications software tools that are aimed at a particular business problem, as well as products with more generic uses such as fourth-generation languages and decision support systems. Applications tools currently account for more than 75% of software package sales by value, and that percentage is increasing.

Explanations

Some Japanese have tried to explain their country's lack of production of packaged software in terms of such things as the early American head start in software technology, IBM's dominance over the Japanese computer industry, the traditional reliance on custom software in Japan and the relative lack of individualism in Japanese culture. However, those explanations are not satisfying.

Japan has become competitive in areas where its competitors had much longer head starts. In addition, IBM is even more dominant in the U.S. — the center of the independent packaged software business — than in Japan. IBM's de facto standards have made the independent packaged software business possible.

The argument that the Japanese reliance on custom software has somehow squeezed out packaged software in Japan is based on two factors.

First, almost half of customized software in Japan is supplied free as an adjunct to a hardware sale. Second, it is argued, custom software will almost always fit an enterprise's needs better than a package.

Lack of understanding

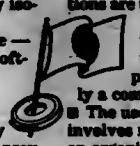
These arguments do not ring entirely true, however. Nothing is free, including the software bundled as part of the sale of a hardware system. Reliance on free software shows a lack of understanding toward software generally rather than a bias against packaged software per se.

The preference to custom as opposed to packaged software is hardly a Japanese phenomenon.

Given relatively high Japanese wages, Japanese businesses should be under the same economic pressure to use packaged software as their counterparts in the U.S.

The prevalence of custom software could be an effect as well as a cause of the lack of packaged software. It certainly does not explain the use of imported packages.

The explanation favored by some Japanese, that Japanese social conformity explains the dearth of software packages, is at first plausible — if we assume that most software is invented by isolated geniuses.



However, much more — and usually better — software is created by small work teams. Such a work environment is quintessentially Japanese; consider the prevalence of quality circles in Japanese industry.

Before an alternate theory can be considered, packaged software's key characteristics should be examined:

- Even though many options are usually provided by packaged software, any widely used software package is essentially a compromise.
- The use of most packages involves making changes to an organization's procedures. Even where the new procedures are better, they are often resented.
- A good package will consume more hardware resources than a good customized program.

'But it works'

The significant aspect of software packages — including good packages — is their relative crudity. As a knowledgeable technician once said of a very well-known, expensive and widely admired package, "It's kludgy, but it works."

Let's consider for a moment product packaging.

In the West, packages have long been machine-made — most handmade packages were both less attractive and less functional than what has replaced them.

The opposite is true in Japan. Contemporary Japanese machine-made packages are often barely functional. It is hard to square the crudity of Japanese packages with the concern for aesthetic principles that typifies Japa-

See JAPAN page 52

SOFTWARE & SERVICES

Continued from page 80

an initial license.

ADE software for the 32-bit cluster and distributed workstation systems, including the MV/4000DC, the DS/4300 and DS/4000, is licensed for $7,000; the ADE extension is $5,000.

DG, 4400 Computer Drive, Westboro, Mass. 01580.

■ MacKinney Systems has released a screen generator for IBM's CICS environments.

CICSMapr II is said to include screen painting and copy facilities that allow users to build a new map using an existing map as a base. Screen development is done interactively under CICS. The package supports page building and functions of IBM's Basic Mapping Support product. CICSMapr II is priced at $695.

MacKinney Systems, Box 270-A, Rt. 2, Fair Grove, Mo. 65648.

■ Computer Resources, Inc. (CRI) has introduced a data dictionary for Hewlett-Packard Co.'s HP 3000 series minicomputers.

A spokesman said that the Dataguide data dictionary is available as an option to CRI's Relate 3000 relational data base management system or as a stand-alone program. Dataguide provides documentation for data bases, files, fields, indexes, index types, procedures, passwords and users.

Dataguide is priced at $3,000 for the HP 3000 Model 37 and $5,000 for all other HP 3000 models.

CRI, P. O. Box 58004, 5333 Betsy Ross Drive, Santa Clara, Calif., 95052.

APPLICATION PACKAGES

■ J. D. Edward & Co. has announced its World Systems accounting software, consisting of 712 programs for the IBM System/36, including applications for accounts payable and receivable, general ledger, financial reporting and address records processing.

Reportedly, the company's JDE data dictionary allows nontechnical users to tailor screens, menus, report headings and help instructions. Dictionary definitions and allowed values are displayed by entering a question mark in any input field.

A World Systems package costs $40,000 for a permanent license.

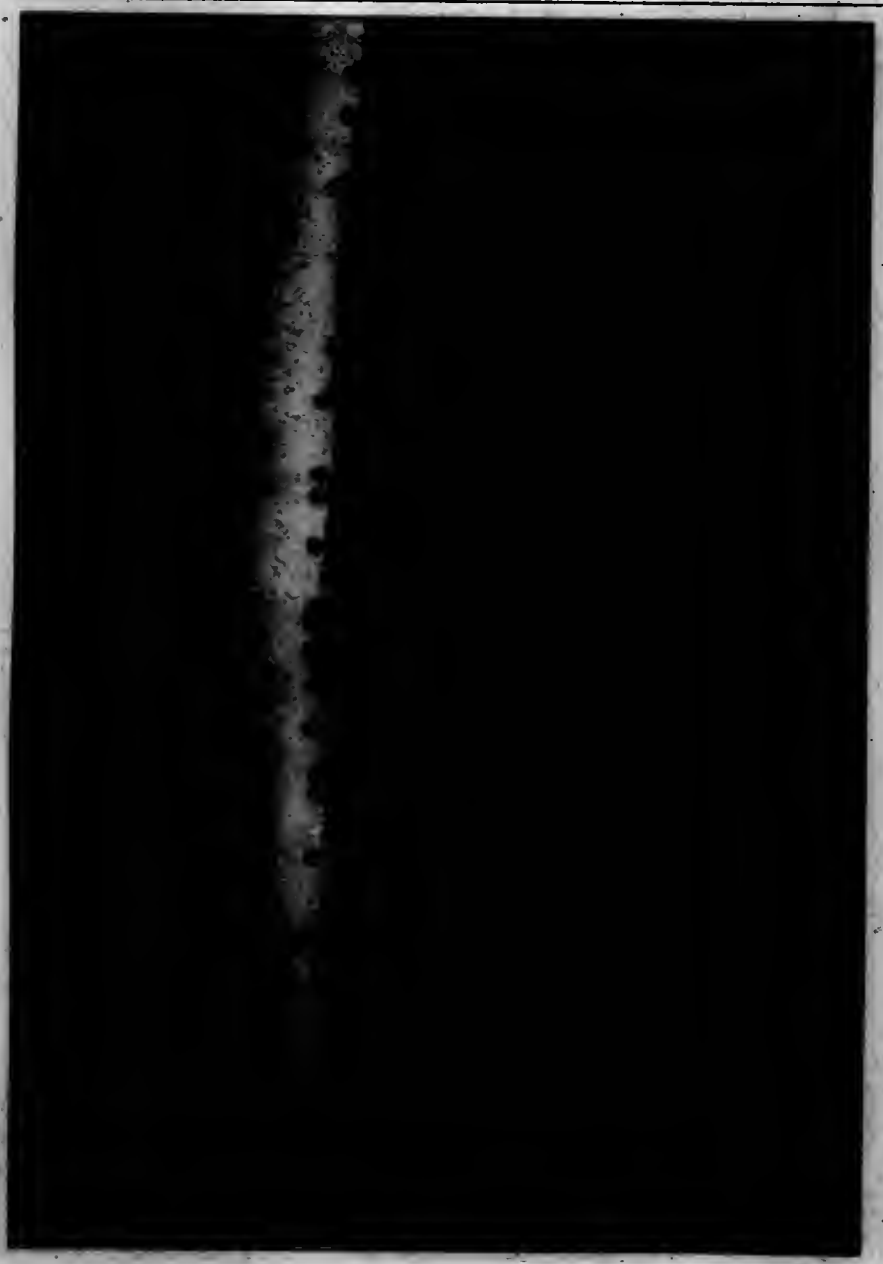
J. D. Edwards, 4949 S. Syracuse St., Denver, Colo. 80237.

■ Computer Solutions has introduced a fixed assets management module for its Growthpower integrated manufacturing, financial and marketing software for Hewlett-Packard Co.'s HP 3000 series minicomputers.

According to a spokesman, the fixed assets module stores financial information about an asset, calculates depreciation and projects future values of property and equipment. Investment tax credits can be calculated and maintained. Fixed assets include provisions for state and local tax reporting systems.

The Fixed Assets module costs $4,500.

Computer Solutions, One Burlington Woods, Burlington, Mass. 01803.



JAPAN from page 51

nese culture.

Traditional Japanese packaging, on the other hand, is another thing completely. Very specific, highly functional and extraordinarily artistic, it is one of the highest achievements of any culture's everyday life. Those who have seen the recent touring exhibition on the Japanese package know this to be true. A scholar said, "Take any traditional [Japanese] packaging and you are sure to find a subtlety of handwork that is uniquely Japanese."

Traditional packaging gave way initially not so much for economic reasons but because Western machine-made packaging must have seemed to contain the essence of Western technology, which 19th century Japan was single-mindedly absorbing. Ultimately there would be economic justifications as well.

Custom software can provide the same individualized functionality typical of old-style packages. A specific program can also be more personalized and, if you will, aesthetic, even if assembled from semistandardized components.

Customized software speaks to a very basic part of Japanese culture. Software can be seen as an area of endeavor where the handicraft tradition gets a chance to live on in modern dress. If this is true, then customized software will be quite hard to dislodge.

This is especially true because an advanced and self-confident Japan will not be likely to automatically take to packaged software merely because it has become a norm in the U.S. There is still a significant number of U.S. enterprises that will argue the benefits of custom software. Given the discipline of Japanese organizations, the customized "software factories" could, in fact, give many run-of-the-mill software packages a run for their money.

A complicating factor in the debate over custom vs. packaged software is the difficulty of trying to determine a winner. This arises out of the confusion over costs and benefits of software production and use, as well as the paucity of useful information on software productivity-related issues. Until these issues are better understood, it will be extremely hard to say that custom software is really that much more expensive than a software package.

So we are left with two conclusions: The Japanese will continue to give more weight to custom, rather than packaged software. And they may not be wrong in doing so.

GO FOR THE BEST, REGARDLESS OF COST EVEN IF IT'S CHEAPER.

	THE LEADING EDGE™ PERSONAL COMPUTER	THE IBM® PERSONAL COMPUTER
Display	Hi-res monochrome display standard	Monochrome display—$275. Monochrome controller—$250.
Memory	256K Standard	256K Standard
Speed	7.16 MHz and 4.77 MHz Standard	4.77 MHz Only
Expandability	Expandable to 640K No additional boards	Expandable to 640K Must add two boards
Disk Drives	2—360KB Drives Standard	One Drive Standard Additional Drive—$425.
Battery Backed Clock/Calendar	Standard	Not available from IBM
Ports	Both Parallel and Serial Standard	Serial—$100.
Expansion Slots	7 slots Standard of which 4 remain open after expansion to 640K	5 slots Standard of which none remain open after expansion to 640K
Warranty	One Full Year parts and labor	90 Days parts and labor
Support	Lifetime no charge toll-free hotline Standard. The best in the industry	None on hardware. Software optional at $40 per call.
Service	Nationwide Service Centers	Nationwide Service Centers
Price	$1,995 Complete	$3,110 (Configured as basic Leading Edge PC)

LEADING EDGE PC: THE GREAT UNKNOWN

Leading Edge Products, Inc.
Systems and Software Division
225 Turnpike Street, Canton, MA 02021
800-343-6833, (617) 828-8150

IBM is a registered trademark of International Business Machines Corporation
Leading Edge is a trademark of Leading Edge Products, Inc.

DOS from page 45

or a 3080 series CPU.

Ernst is typical of DOS users who, struggling to hang onto DOS, face obstacles and uncertainty. Most DOS shops have only two to three support personnel and perhaps 10 to 20 applications programmers. Converting an operating system is an expensive and time-consuming undertaking, during which systems personnel are not engaged in supporting day-to-day business operations.

Peter Clark, systems programming administrator at Olan Mills, Inc. of Chattanooga, Tenn., which runs DOS/VSE under VM on a 3033 and a 3083, has been resisting IBM's advice to move from DOS for years. "It would be an expensive conversion, and during the effort we would not be making any progress toward meeting our company goals," he said. But the company's needs are growing, and Clark knows he must constantly reexamine his decision to remain with DOS.

With DOS running in 46.9% of all IBM installations, in the estimation of International Data Corp. (IDC) of Framingham, Mass., DOS users are a large and vocal contingent. Through users groups, DOS users can pressure IBM and get answers. Attempts to kill DOS in the past failed after users raised their voices in opposition.

User conversion will be slow

Thus, the process of converting DOS users will be a slow one, with IBM being careful not to alienate its DOS users — even though they may not be the biggest and richest of IBM's customers. Perhaps IBM is paying lip service to its DOS customers by saying DOS/VSE will continue to be enhanced. But IBM is scheduled to ship VSE/SP 2.1 in April, with a major enhancement of virtual memory from 16M bytes to 40M bytes. How it will perform remains to be seen.

The conversion to MVS/XA has been happening at a slow rate. IDC found that 20% of 4331, 4341, 3030 and 3080 series users who upgraded operating systems in 1984 moved to MVS/XA. For DOS users who are converting, it makes more sense to convert to MVS/XA all at once, rather than to MVS initially and then to MVS/XA at a later date, in the opinion of Shaku Atre, president of the Rye, N.Y.-based Atre International Consultants, Inc.

One DOS user is converting directly to MVS/XA in response to his firm's expansion. Bob Heist, manager of technical services at Carpenter Technology Corp. in Reading, Pa., was attracted to MVS/XA by two critical factors: virtual storage constraint relief and an advanced I/O subsystem. The firm has over 500 terminals linked to a 3083 and a 4381 Model 2, which is being upgraded to a Model 3 to run MVS/XA. The firm also has 24 3375 disk drives and eight 3380 spindles.

Drawbacks to the MVS/XA conversion included added demands on the staff of 45 programmers and an increased software budget. "IBM software products are quite expensive," Heist said, inflated even more by the hiring of two systems operators experienced in MVS.

Even though Heist's shop will no longer run DOS, a program called UCC2 from Uccel Corp. of Dallas will allow Carpenter to run DOS object programs under MVS/XA.

It seems the combined opinions of users, analysts and vendors can be summarized in a multiple-choice question: What is the future of DOS?

A. DOS will remain the starter operating system for IBM small systems users.
B. DOS will merge with VM.
C. DOS will merge with MVS.
D. IBM will drop DOS.
E. None of the above.

Anyone with an accurate answer would have the insight of the president of IBM and may drink from the DOS cup.

REPORT from page 45

tion, capacity planning, training, software development and communications.

The IDC report identified three classes of micro-mainframe links: terminal emulation, through which micros can be made to appear as terminals to communicate with the mainframe; virtual systems, where some portion of host storage is reserved for micro user needs; and integrated systems, where the micro can be transformed into an intelligent workstation that can access and manipulate information residing on the host.

Of the 43 survey respondents that identified the source of their linking software in the survey, 28% said they used in-house-developed software links only, while 44% said they used vendor-supplied products. Two respondents said they used two or more third-party products for linking micros to mainframes. The same number said they used a third-party package in conjunction with an in-house-developed link.

Of the companies that employed micro-mainframe links, 7% permitted read-only access via terminal emulation and 29% allowed both read-only access and file download capabilities for data manipulation, IDC said.

The report is priced at $660 and is available from IDC, 5 Speen St., Framingham, Mass. 01701.

PICK from page 45

ported on a wide range of processors, from the IBM Personal Computer XT to IBM mainframes under VM. The Open Architecture version of Pick will be available this month. Product pricing is determined by individual Pick distributors.

Pick Systems is located at 1691 Browning , Irvine, Calif. 92714.

MICROCOMPUTERS

Wordstar 2000 gets high marks, some criticism

By Kathleen Sullivan
CW West Coast Bureau

PASADENA, Calif. — When Jeffrey Skaletsky first heard that Micropro International Corp. had designed a successor to Wordstar, he was skeptical about the program's chances for success. "I thought the original Wordstar was a flash in the pan," said Skaletsky, a microcomputing analyst at the National Aeronautics and Space Administration's Jet Propulsion Lab here.

Now that he has had a chance to use Wordstar 2000 for about two months, writing memos and letters and preparing documents on an IBM Personal Computer AT, most of Skaletsky's misgivings have faded away. The new program, he said, is much more professional and sophisticated than the original Wordstar.

Like two other early users of Wordstar 2000 interviewed by *Computerworld*, Skaletsky gave the program high marks for its overall design; its mnemonic command set, which all three users described as intuitive; and its intelligent use of function keys.

Yet the program also has shortcomings that need to be improved, the users agreed.

All three criticized the program's performance by saying that Wordstar 2000 was too slow. Skaletsky, the only user running Wordstar on an IBM Personal Computer AT, characterized the program's speed as reasonable on that machine but too slow on the Personal Computer XT. He added that the program was "too cumbersome and large" for a floppy-disk-based system.

Jonathan Marcus, manager of microcomputer technology services at Cupertino, Calif.-based McDonnell Douglas Applied Communications Systems Co., has been running Wordstar 2000 for about three months on his IBM Personal Computer XT.

"Since I only use Wordstar 2000 for preparing memos that are one to two pages long, the speed doesn't bother me," he said. "However, if I were preparing documents that were five to 10 pages long, I would have to agree that the program's performance would have to be seen as an impediment to selecting Wordstar 2000 over an-

See USERS page 61

Photomail hits market

Tool sends images between IBM micro users

MERRIMACK, N.H. — Photomail, an icon-driven software package that allows IBM Personal Computer users to capture images with a standard video camera or videocassette recorder and send them over dial-up phone lines to remote Personal Computers, has been introduced by Chorus Data Systems, Inc.

Photomail supports alternating voice and data operations, allowing users to interact with each other while an image is being displayed on both computer screens, Chorus said. Using a mouse or the keyboard, users can point to a specific area of the picture for highlighting on the other computer's screen.

The package reportedly works with still-frame pictures of diagrams, text, people, products or objects digitized at up to 640 by 400 pixels by 16 colors or levels of gray. Photomail can also capture and send standard IBM screens generated by programs such as Lotus Development Corp.'s 1-2-3, according to Bruce Monk, Chorus' marketing vice-president.

Photomail's interactive features "establish a better reference point in communicating," speeding up jobs and reducing errors, Monk claimed. Potential customers include advertising agencies, service and maintenance organizations, design and engineering firms, security groups, medical organizations, real estate brokers and insurance agencies, as well as many other businesses, he suggested.

The program requires Chorus' PC-Eye plug-in board, which occupies a single expansion slot, connects directly to

See ICON page 60

Osborne foresees price plunge

SMALL TALK
Kathleen Sullivan
CW West Coast Bureau

In microcomputer circles, Adam Osborne is known for his brash style and controversial pronouncements, which are delivered in a precise British accent and seasoned with a heavy dose of bravado. Now president of his own software firm, Osborne recently leveled his sights on the software industry and fired off a few rounds on software pricing.

"The software industry is in for a disastrous change," he warned a group of systems professionals at a meeting of the Association for Systems Management in San Francisco recently. "The companies that are now charging $500 for a software package will only be able to get away with that price for another three to four months." By summer, prices for software will plummet. After that, Osborne predicted, software packages will cost $95 at most.

"People are still talking about perceived-value pricing, a concept that is propped up by a loose confederation of software stores and companies," he continued. But within a short period of time, users will stop buying the notion that a program's worth is reflected in its price tag, Osborne said. No firm will be able to buttress its high prices with a reference to perceived value, he said.

According to Osborne, the software industry will soon resemble book pub-

See PRICES page 60

- DEC has introduced an electronic mail module for its A-to-Z software system on the Micro/PDP-11/67
- Corvus Systems has announced software giving Appletalk network users shared access to Corvus Omnidrive disk drives/67
- Pick Systems has upgraded its Pick operating system for the Personal Computer XT/68

INSIDE

Dialog manager added to Advanced Productivity System

By Jeffry Dooley
CW West Coast Bureau

SAN FRANCISCO — The supplier of the Advanced Productivity System (APS), a software system that reportedly uses IBM Personal Computers to boost programmer productivity, has enhanced its offering with additional features aimed at accelerating applications maintenance, testing and editing.

Arrix Logic Systems, Inc. has added a dialog manager said to aid program maintenance by greatly simplifying screen-panel updating.

The dialog manager divorces screen panels from their associated applications code and thus spares programmers the time-consuming task of revising the latter when they update the former, Arrix Chairman Heinz Buettner said.

APS has also recently been enhanced with a "hex editing" feature that automatically converts Ebcdic text into its Ascii equivalent or vice versa, Arrix system developer Farzad Amin said. Such a capability reportedly reconciles the differences in coding conventions between the Ebcdic world of mainframes and the Ascii realm of micros and permits program editing and testing to be off-loaded from one to the other.

In the wake of its latest enhancements, APS now consists of four integrated program productivity modules, which were described here during a recent press conference. In addition to the dialog manager, the subsystems include the following:

- SPF, which interacts with users through menu screens and allows disk-stored data to be browsed or manipulated.
- Script, a formatting module that aids in the preparation of program documentation and other text.
- A VM Flist module, a user-customizable list of development tools that programmers can invoke without having to leave their current programming environments and then reboot.

Together, the above modules enable the APS to hasten software development by off-loading programming tasks from mainframes to micros, according to Fred Schmidt, Arrix's vice-president of sales and marketing.

The APS has already undergone beta testing at Blue Cross of California in nearby Oakland, according to Ted Case, the organization's information center consultant. Blue Cross expects use of the APS to improve its time-sharing option response times by permitting "trivial" mainframe programming tasks like documentation, flow charting, text editing and syntax checking to be moved to micros, Case said.

Amin said that in designing the APS, Arrix sought to achieve three performance objectives — speed, ease of use and fidelity to IBM's mainframe programming environment, Amin said. Accordingly, the software company has optimized its SPF module to deliver "subsecond" response times — far better performance than programmers would typically encounter with a shared mainframe, Schmidt said.

Arrix has also designed SPF to replicate 90% of the commands found in IBM's widely used mainframe-based development aid, the Interactive Systems Productivity Facility, he added.

When its constituent modules are purchased as a package, the APS sells for $480.

More information is available from Arrix, Box 142, Don Mills, Ont., Canada M3C2B6.

HOW CAN I CHOOSE SOFTWARE FOR PERSONAL COMPUTERS WITHOUT GETTING EATEN ALIVE?

HERE'S HOW:
dBASE III SOFTWARE

Choosing the right software for personal computers is like dodging hungry alligators. For some types of software, it's tough to pick one program that everyone can live with. Fortunately, when it comes to picking data management software, dBASE III™ is the clear choice. With dBASE III you don't have to choose between an easy-to-use program that's a lightweight data manager, or a powerhouse of a program that requires an advanced degree to understand.

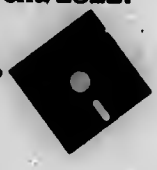
dBASE III offers an elegant solution to the database problem. We've created an Assistant which guides novices through dBASE III as if they were selecting dinner from a restaurant menu. Beneath that friendly facade, there's a versatile database management system which takes advantage of all the potential of 16-bit computers.

dBASE III fits the bill for any specialized PC database application. The built-in dBASE™ programming language is perfect for rapid development of programs that even a total novice can easily use.

dBASE III software from Ashton-Tate is the world's best-selling data management system. And dBASE has solved more data management problems than any other personal computer program ever created.

Software selection doesn't have to be a harrowing experience. dBASE III is the data management program that will leave you free to fight the real alligators in your pond.

For a dealer near you call (800) 437-4329, ext. 2322. In Colorado (303) 799-4900, ext. 2322.



Software from

ASHTON·TATE™

We'll put you in control.

DEC A-to-Z gets E-mail option

MAYNARD, Mass. — Digital Equipment Corp. has announced the addition of an electronic mail module for its A-to-Z integrated system on the company's Micro PDP-11 multiuser systems.

A company spokesman said A-to-Z electronic mail is designed to work with other A-to-Z business modules, sharing the same menu and user interfaces.

The A-to-Z word processing module can produce electronic mail messages, memos, letters and reports.

Messages can include bar and pie charts, graphics, text and spreadsheet data, the spokesman said.

Users reportedly can interrupt one program to enter another, retrieve data on demand and return to the original program.

A license for the A-to-Z system costs $1,000. The electronic mail module is priced at $600.

Digital Equipment is headquartered in Maynard, Mass. 01754.

Omnitalk out from Corvus

SAN JOSE, Calif. — Users of Apple Computer, Inc.'s Appletalk network reportedly can gain shared access to the Corvus Systems, Inc. Omnidrive disk drives with Corvus's recently introduced Omnitalk software.

Omnitalk is said to allow users to share applications software and to read and write to different files on the Omnidrive. It also permits Omnidrives currently in use with Macintosh computers to become a network resource.

Omnidrives reportedly can be configured on Appletalk by direct connection.

Designed to work with the Apple file retrieval utility program, Omnitalk offers controlled access to the Omnidrive, Corvus said. It lets users divide the Omnidrive into public, private and controlled volumes with password protection at the user, volume and drive levels.

Private volumes allow a single user both to read and write to specific parts of the drive. Public volumes can be read by all users, and controlled volumes can be read by any number of users, but only one user at a time can write to them.

Omnitalk costs $395.

Corvus Systems is located at 2100 Corvus Drive, San Jose, Calif. 95124.

Phoenix offers C language program analyzer

NORWOOD, Mass. — A program analyzer for use with the C language for programming on the IBM Personal Computer line and compatibles has been introduced by Phoenix Computer Products Corp.

Pre-C is said to be a superset of the AT&T Unix system's Lint utility. Pre-C reportedly increases productivity by identifying hard to locate program statement errors, including interface inconsistencies. Pre-C is priced at $395.

Many errors that are difficult to isolate using a debugger can be uncovered using Pre-C, Phoenix said.

While producing a collection of diagnostic messages, Pre-C automatically identifies incorrect subroutine calls.

Phoenix said Pre-C can complement the use of a debugger because it can find statement errors that debuggers do not find efficiently, while a debugger locates dynamic errors that Pre-C cannot.

Pre-C's diagnostics reportedly facilitate the porting of programs written in C to other operating systems.

Pre-C supports several popular C compilers, including Lattice, Inc.'s Lattice C, Mark Williams Co.'s C and Computer Innovations, Inc.'s C86.

Phoenix Computer Products is located at Suite 220, 1416 Providence Highway, Norwood, Mass. 02062.

SOFTWARE

■ Qtech Associates has released its Qplot/PC graphics package for the IBM Personal Computer.

The Qplot/PC software, written in Fortran, is said to be able to plot on any graphics device that can draw a vector. The package requires Microsoft Corp.'s Fortran runtime library.

The Qplot library reportedly includes routines for two-dimensional rectangular and polar plotting, three-dimensional rectangular plotting with hidden line removal, flow charting, mapping and typesetting. The Qplot/PC package costs $250.

Qtech Associates, P.O. Box 952, Old Lyme, Conn. 06371.

■ Tritek Vision Systems, Inc. has released a version of its Exceadd three-dimensional design and drafting software that runs on the IBM Personal Computer, Personal Computer XT or Personal Computer AT under Microsoft Corp.'s MS-DOS 2.0 or higher.

Features include editing that allows surfaces to be extruded, spun or fit manually into a three-dimensional object; automatic rendering of multiple-point perspective views; and the ability to work with a number of objects and create exploded views. The package reportedly is compatible with Autodesk, Inc.'s Autocad and Personal CAD Systems, Inc.'s Cadplan design software.

The software costs 1,500.

Tritek Vision Systems, Suite 1512, 4710 University Way N.E., Seattle, Wash. 98105.

■ North America Mica, Inc. has introduced its GPS-II printer graphics package for the IBM Personal Computer and personal computers under Digital Research, Inc.'s CP/M and CP/M 86 operating systems.

GPS-II is an add-on to PMS-II, the vendor's critical path network analyzer and scheduling package, priced at $1,295. GPS-II reportedly converts PMS-II network diagrams, bar charts, graphs and histograms into graphics presentations without the use of a plotter.

It also provides time-series, time-scaled, network diagrammed and sideways printing of all PMS-II diagrams, graphs and histograms as well as those of the vendor's RMS-II.

Also reportedly included are sort and selection reporting capabilities in daily, weekly and monthly format.

GPS-II is priced at $695.

North American Mica, Suite 110, 5330 Carroll Canyon Road, San Diego, Calif. 92121.

See TOOLS page 90

Pick unveils enhanced system for IBM micro

IRVINE, Calif. — Pick Systems has unveiled an enhanced version of its Pick multiuser operating system for the IBM Personal Computer XT.

Version 1.3 of the Pick PC-XT system is said to include expanded hard-disk storage capabilities and an on-line tutorial.

The Pick PC-XT System 1.3 can be configured to use two IBM 10.5M-byte hard disks for a total of 21M bytes, a spokesman said. The configuration for the additional hard disk can be set up through an option on the installation menu when the user installs the operating system.

The product's on-line tutorial provides training in the use of the Pick operating system.

The Pick PC-XT System 1.3 is identical to Pick's R83 system, which was released to all licensees last autumn, the vendor said. The software is priced at $495.

Pick also has introduced Jet, a $249 word processor for users of the Pick operating system on the Personal Computer XT. With Jet, users can create documents by automatically merging data from any file available on the operating system, the supplier said.

Both the enhanced operating system and Jet will be available this month.

Pick Systems is located at 1691 Browning, Irvine, Calif. 92714.

MICROCOMPUTERS

TOOLS from page 58

■ **Wicat Systems, Inc. has introduced a version of the Pick Associates, Inc. Pick multiuser operating system for its Systems 150, 155, 160, 200, 220 and 2220 microcomputers.**

The Pick operating system for those Motorola, Inc. 68000-based machines is a standard version, according to Wicat. The package reportedly provides efficient disk I/O and comes bundled with a word processor and spreadsheet, graphics, Help processor, tutorial and high-level applications generator software.

The addition of Pick reportedly brings to three the number of operating systems available for the Wicat micros.

The Pick operating system is priced from $12,000 to $80,000, depending on the microcomputer system.

Wicat Systems, 1875 S. State St., Orem, Utah 84057.

■ **Beaman Porter, Inc. has introduced its Powertext Formatter, a software package to enhance the output of word processing packages on the IBM Personal Computer.**

Powertext Formatter enhances such packages as Software Publishing Corp.'s PFS:Write and IBM's Writing Assistant by enabling users to produce documents with justified and true proportional text, the vendor said.

Also available is the capability to provide footnotes on the same page and multiple columns of text and/or numbers.

Support is said to be provided for wide documents, including schedules, calendars and presentations. The software package features format files that rely on English language commands.

Powertext Formatter is priced at $49.95.

Beaman Porter, 417 Halstead Ave., Harrison, N.Y. 10528.

■ **Forethought, Inc. has introduced its Filemaker single-file data base software for the Apple Computer, Inc. Macintosh.**

Filemaker, priced at $195, reportedly allows users to create custom-designed reports and forms. It permits users to organize and present such information as files, orders, shipments, inventory, project status and personnel records.

The number of records, fields, reports and files in Filemaker reportedly are only limited by disk space, and records may contain any combination of text, number, date, calculation or summary fields. Filemaker allows an unlimited number of report layouts for each file.

The software is said to be compatible with all other Macintosh software using the text, Sylk or columnar file storage methods.

Forethought, 1973 Landings Drive, Mountain View, Calif. 94043.

■ **Datagraphic Systems, Inc. has enhanced its CAD Master computer-aided design software for the IBM Personal Computer line. The enhancement reportedly includes a translator for the National Bureau of Standards' Initial Graphics Exchange Specification (IGES) standard.**

Support of IGES is said to allow drawings stored on mainframe CAD systems to be downloaded to the IBM Personal Computer line. Under CAD Master, the drawing may be displayed, zoomed, edited and enhanced.

CAD Master reportedly can redraw a 1,000-element design in less than three seconds on the AT.

CAD Master is priced at $2,495.

Datagraphic Systems, 9101 General Drive, Plymouth, Mich. 48170.

STORAGE DEVICES

■ **Kamerman Labs has introduced Masterflight, a storage unit including hard disk storage, backup system and power directors for the IBM Personal Computer, Personal Computer XT and Personal Computer AT.**

The unit is 2½-in. high and reportedly integrates a half-height 10M-, 20M- or 33M-byte hard disk; a backup system, including half-height 20M-, 40M- or 60M-byte streamer tape; and five power direction switches, including computer monitor, printer with two auxiliary switches, a locking security key and a surge protector.

Base price for the Masterflight is $3,795.

Kamerman Labs, 8054 S.W. Nimbus, Beaverton, Ore. 97005.

See STORE page 62

PRICES from page 55

linking, "where publishers survive by [taking advantage of] authors." He said the developers who write for his latest venture — Berkeley, Calif.-based Paperback Software International — shoulder all the development risks. "That way, if a software developer picks the wrong program or the wrong machine, it's his nickel," Osborne said.

Once software prices fall below $100, Osborne predicted, applications programs "will cease to be an investment." Instead, like a book that did not measure up to its reviews, software will be seen as an item that is easily discarded if found wanting.

Analysts had strong reactions to Osborne's predictions. These industry watchers said that, currently, programs that cost less than $100 — whether they are compilers, word processing programs or desk accessory packages — provide a limited set of features. While useful, these programs will not replace the recent crop of business software, they said.

According to Robert Lefkowits, director of software research for Infocorp, a Cupertino, Calif., firm, business software packages priced from $495 to $695 are "holding their prices well" — a pattern that will continue. Rather than expecting falling prices, he said, users should look for "more bang for the buck," with increased functionality and a more user-friendly design.

Support also becomes an issue for users who buy low-price software, the analysts said. Osborne's firm, for instance, actively discourages users' questions by charging $1 per minute for phone inquiries, with a $5 minimum charge.

"That strategy won't fly in the business market," Lefkowits said.

Andy Seybold, a Torrance, Calif.-based consultant and contributing editor to the "Seybold Report on Professional Computing," characterized Osborne's strategy as a "shotgun approach" to software marketing. "[Osborne] will get 3,000 products out on the market and hope that 100 might sell well," he said. The high-end business market will be fueled not by a plethora of software but by a new emphasis on the integration of software programs under a common operating environment, he said.

In this scenario, users will mix and match software packages, which will run under a transparent user interface, such as IBM's Topview or Digital Research, Inc.'s Graphics Environment Manager, Seybold said. "That will require a higher level of support than what's now available," he said.

"More and more, the push will be toward total integration," Seybold said. "That will cost more money — not less."

Mary Ellen Dick, who manages software research at Software Access International, Inc., a Mountain View, Calif., firm, said Osborne's company is able to charge inexpensive prices because it pays its authors pennies. "Paperback Software is really more of a distributor," she said. By contrast, companies developing their own software have higher overhead requirements that are reflected in software prices.

She also disagreed with Osborne's statement that software will no longer be seen as an investment. "Software is an investment not because of its price but because of the time, training and data it represents," she said.

> ***"Within a short period of time, users will stop buying the notion that a program's worth is reflected in its price tag."***
>
> — Adam Osborne
> Paperback Software International

ICON from page 55

any EIA RS-171 or RS-330 video source and digitizes the video signal. Images are displayed either by the IBM color adapter card (with 320 by 200 pixels by four colors or gray levels, or 640- by 200-pixel monochrome display) or Tecmar Graphics Master card (providing 640 by 400 pixels by 16 colors or gray levels).

Text editing is said to permit users to label areas of an image, type messages and create image descriptions or specifications.

The program supports Hayes Microcomputer Products, Inc. and compatible modems operating at 1.2K bit/sec and 2.4K bit/sec. Full screen images can be transmitted in less than a minute at 2.4K bit/sec, Monk said.

Images taking up one-eighth to one-half of the screen also can be sampled.

The program works with the Personal Computer, Personal Computer XT and Personal Computer AT and compatible systems, Chorus said. It supports the IBM Graphics Printer, Epson America, Inc.'s Graphics Printer and Hewlett-Packard Co.'s Thinkjet.

Photomail software costs $795. A complete kit, including Photomail, PC-Eye, graphics card and Chorus' Screenmaster software package, which provides 16 shades of gray on an IBM color monitor, is priced at $2,495.

Chorus is located at 6 Continental Blvd., Merrimack, N.H. 03054.

USERS from page 55

other program."

Marcus said he is anxiously awaiting Micropro's second release of Wordstar 2000, hoping for a version that makes more efficient use of the machine's resources.

Until then, he said, McDonnell Douglas will adopt a wait-and-see attitude and postpone a decision on whether to give Wordstar 2000 to its employees who are currently using Wordstar.

Jackson Booth, a manager in the financial planning department at Monterey Insurance Agencies in Monterey, Calif., described himself as a fast typist who found Wordstar 2000's slow speed annoying, especially on the occasions when he sat waiting for the cursor to catch up to his typing.

The slowness was not noticeable when he deleted words or blocks of text, Booth said, but it became obvious when he deleted one letter at a time.

> ❞
>
> *Three early users of Wordstar 2000 gave the program high marks for its overall design, mnemonic command set and intelligent use of function keys.*

According to Skaletsky, who purchased Wordstar 2000 Plus, which includes a simple data base manager, indexing and communications functions, the program's telecommunications package was "not the easiest one to configure."

Package 'incomplete, fragile'

He described the program as incomplete and fragile. The package "refuses to dial a modem when you go into even parity," an important feature for mainframe communications, he said.

In addition, he said, there is no easy way to convert a Wordstar 2000 file into straight-Ascii code for mainframe transmission. "That's a problem we're still trying to solve," he said. "Micropro should address that issue."

Skaletsky also noted that Wordstar 2000 "takes up a horrendous amount of space on a hard disk." The program consumes 2.1M bytes of disk space, including the tutorial. That creates a problem for users with 10M-byte disk drives, since they had to consider kicking off other programs to make room for Wordstar 2000.

Skaletsky also noted that it is "impossible to force Wordstar 2000 to reformat a document" so that it conforms to an individual's sense of aesthetics. "You really need that feature to turn out quality documents," he said.

Booth, on the other hand, enthusiastically called Wordstar 2000 a phenomenal program. He said he decided to try it because of its ability to handle large documents in a single file. He said he was able to transfer a 100-page document from Multimate Corp.'s Multimate to Wordstar 2000 with ease, without consulting the documentation.

Documentation rates highly

Booth was impressed with the program's ability to handle Lotus Development Corp.'s 1-2-3 spreadsheet files and integrate them into a word processing document for presentations. He also gave Micropro high marks for its documentation, which he called "a pleasure to read."

All three users, who have extensive experience with computers, said they seldom need to refer to the documentation because of the program's command set and the extensive help available in the program itself. All three cited the program's on-screen boldfacing and underlining as welcome features.

None of the users cited significant problems in hooking Wordstar 2000 up to their printers. Marcus, who uses an Epson America, Inc. printer, said he liked the printer interface, saying that since the program knows the capabilities of the printer, it is able to produce high-quality documents faster than the old Wordstar.

Marcus' favorite feature, however, was the program's spelling checker, which includes phonetic correction. "I would have converted to Wordstar 2000 for that feature alone," he said. "More than 80% of the time it recognizes what I'm trying to spell," he said.

"I don't think you understand computer crime."

STORE from page 59

■ **Memodyne Corp. has introduced a tape backup system for the IBM Personal Computer XT.**

The Model MS-1000 Tape Backup System is a 10M-byte unit, using a floppy diskette interface, said to eliminate the need for an added controller card that would otherwise be used in an expansion slot. The system reportedly offers a data transfer rate of 31.25K byte/sec and requires eight minutes to save or restore a 10M-byte disk's data.

The MS-1000 reportedly comes complete with the software to back up a hard disk and to restore data onto a hard disk.

The system costs $1,395.

Memodyne, 220 Reservoir St., Needham Heights, Mass. 02194.

■ **Davong Systems, Inc. has introduced enhancements to its Fixed Disk software package, which comes with the Davong Datasystem and Davong Fixed Disk mass storage units for IBM's Personal Computer, Personal Computer XT and Personal Computer AT and compatible computers, to ensure full usage of the disk space on storage systems exceeding 32M-byte capacity.**

The software reportedly allows the creation, deletion, activation and formatting of multiple disk partitions. It also includes support for partitions larger than 32M bytes.

The cost ranges from $2,795 to $4,995 when included in the Datasystem model, which has both tape and disk backup and comes in sizes from 10M bytes to 43M bytes. When included in the Fixed Disk mass storage unit, which has disk backup only, prices range from $1,950 to $6,995, depending upon sizes ranging from 10M bytes to 86M bytes.

Davong Systems, 217 Humboldt Court, Sunnyvale, Calif. 94089.

PRINTERS/PLOTTERS/PERIPHERALS

■ **Tecmar, Inc. has introduced its Tecmar Color Monitor for the IBM Personal Computer.**

The monitor reportedly was designed to complement Tecmar's Graphics Master enhancement board for the Personal Computer and offers 640- by 480-pixel resolution and 16 colors.

The monitor reportedly can support computer-aided design functions and can also switch to a green screen display for use with text. It also is said to use a long-persistence phosphor, which reduces flicker and stabilizes the image being displayed.

The monitor is priced at $795.

Tecmar, 6225 Cochran Road, Solon, Ohio 44139.

■ **United Innovations has introduced its Mural Plotter, a large-format flatbed plotter for automated drafting that works off any microcomputer with an RS-232 interface.**

The Mural Plotter uses Hewlett-Packard Co. HP-GL graphics control command language and is said to take plotting media up to 27 by 36 in. The plotter reportedly accommodates roll paper as well as standard plotter pens, which can be adjusted to plot on media as thick as poster board. The plotter uses X-Y positioning technology.

The plotter costs $2,495.

United Innovations, 489 Whitney Ave., Holyoke, Mass. 01040.

■ **Toshiba America, Inc. has announced enhancement of its P351 24-pin dot matrix printer.**

The P351, the enhanced version of the Toshiba P1351, reportedly now offers high-speed draft capability and plug-in font cartridges. It is said to operate at up to 288 char./sec in draft mode.

Also offered is a redesigned acoustical cabinet and the inclusion of Qume Corp. Sprint 11 letter-quality emulation, Toshiba said. In addition, the enhanced model now features a forward-stacking sheetfeeder and the ability to use boldface without degradation in speed.

The P351 costs $1,895.

Toshiba America, Information Systems Division, 2441 Michelle Drive, Tustin, Calif. 92680.

■ **Sakata USA Corp. has introduced its SP-1600 printer. The SP-1600 reportedly has a printing speed of 180 char./sec and a maximum printing range of 8 in. It is able to use fanfold, roll or cut-sheet paper.**

The printer is said to include a parallel Centronics Data Corp.-type interface. A serial interface is optional. Also included are international character fonts, pica, elite and condensed type, double-width printing and underlining.

Also provided with the unit are near-letter-quality fonts, superscript and subscript, italic type, proportional spacing and emphasized printing, the vendor said.

The SP-1500 reportedly has a 3K-byte buffer and is priced at $595.

Sakata USA, 651 Bonnie Lane, Elk Grove Village, Ill. 60007.

■ **Facit, Inc. has introduced its 4550 and 4551 plotters for use in computer-aided design and computer-aided engineering applications.**

The plotters reportedly use vector technology and meet the requirements of Hewlett-Packard Co.'s Graphic Language standard. The plotters also support various paper sizes. The 4550 supports up to 8½- by 11-in. paper, and the 4551 supports up to 11- by 17-in paper.

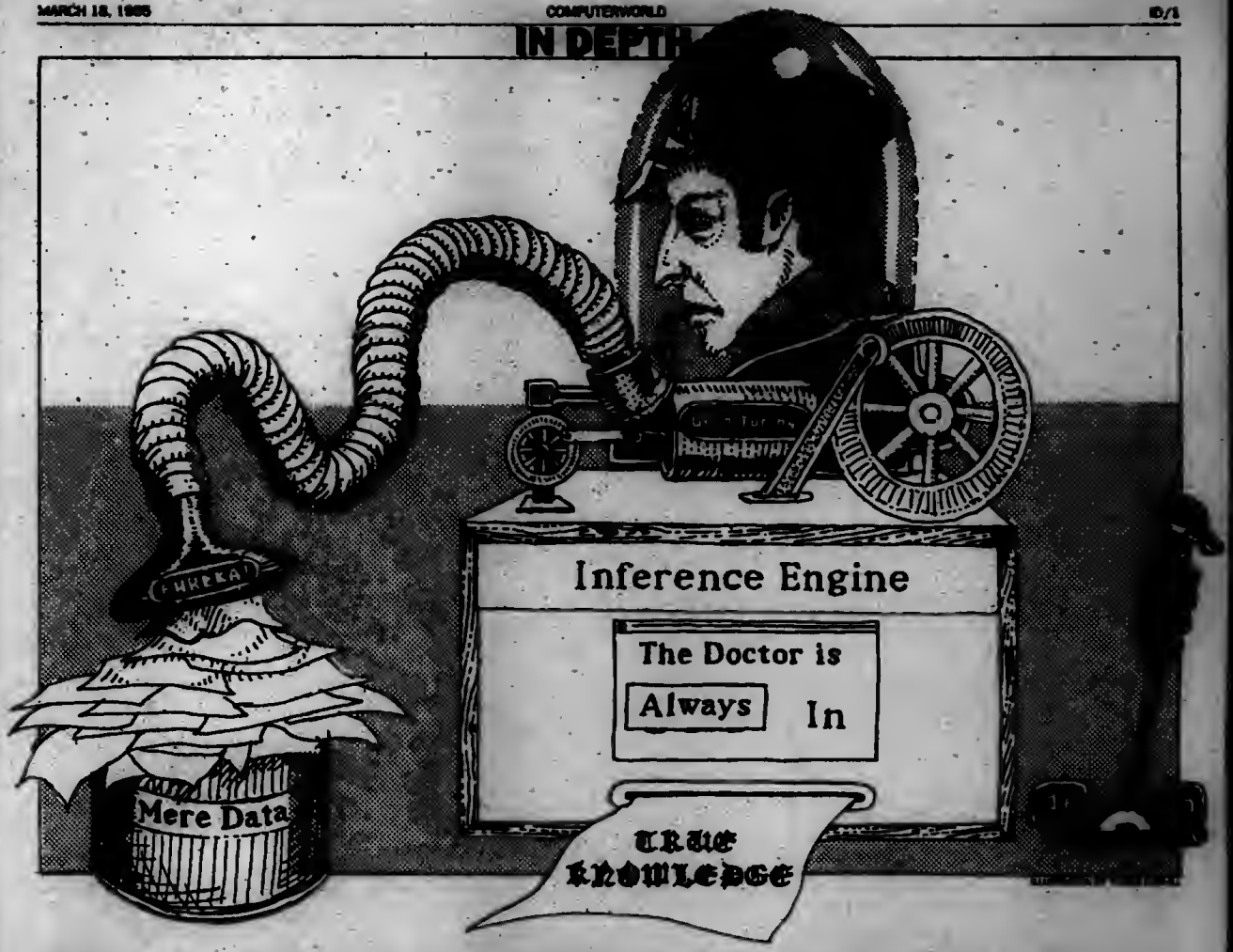
The plotters feature both parallel and RS-232 serial interfaces and are said to offer removable six-pen cassettes that allow users to change pen types and colors for different plotting requirements.

Both operate by clamping paper transparencies between two rollers and moving the media back and forth to create graphs, plots or drawings.

The 4550 is priced at $795. The 4551 is priced at $995.

Facit, 9 Executive Drive, Merrimack, N.H. 03054.

IN DEPTH



The engineers behind expert systems

By Paul Harmon and David King

If performance of a task depends on knowledge that is subjective, changing, symbolic or partly judgmental, that work may well be suited to an expert system. Here's how knowledge engineers build them.

Large-scale knowledge systems are created by knowledge engineers.

Knowledge engineers acquire knowledge from a human expert and then embed it in an expert system. They are specialists in getting the information from the expert, prototyping an expert system that contains that knowledge and then working with the expert to improve the system.

Compared with a conventional software engineer, who also interviews experts and designs and implements a system, knowledge engineers spend much more time with the experts. They are more concerned with the thought processes of the expert. Moreover, they expect to continue to interact with the expert until they can eventually turn over the completion of the system development effort to the expert.

Depending upon the size of the project or the company, there may be more than one knowledge engineer. For example, a senior knowledge engineer may have overall management and design responsibilities, while other knowledge engineers are concerned with day-to-day meetings with the expert. Still other, more junior engineers, are primarily responsible for actually entering code into a machine. We shall speak of a single knowledge engineer, assuming for the sake of simplicity that one individual will perform all the knowledge engineering roles.

Many of the early expert systems were developed from scratch, using either Lisp or some programming environment like Interlisp. Now and in the future, however, most expert systems will probably be developed by means of knowledge engineering tools that will be specifically designed for the rapid development of expert systems. In this discussion, we will assume that this tool-mediated strategy is followed and that our knowledge engineer is well versed in the various expert system building tools now becoming available. We will focus on knowledge system development, the process in which a knowledge engineer and an expert work together to identify and refine a body of knowledge useful for solving an interesting problem.

Development process

Expert systems are developed in six more or less independent phases:

Phase I: Selection of an appropriate problem.

Phase II: Development of a prototype system.

Phase III: Development of a complete expert system.

Phase IV: Evaluation of the system.

Phase V: Integration of the system.

Only Sperry can make the following four statements.

Our PC runs the XENIX™ system, as well as MS-DOS™.

Our 4 new microcomputers run the UNIX system.

Our new minicomputer runs the UNIX system.

Our Series 1100 mainframes run the UNIX system.

All of which means there is a great deal we can do for you.

For instance, our family of computers based on UNIX systems has incredible transportability for all your software.

And being able to accommodate from two to hundreds of users, it's impossible to outgrow our hardware.

Or course, this linking of all your computer systems can add measurably to your productivity.

And a fast way to find out more is to get a copy of cur Sperry Information kit. For yours, or to arrange a demonstration at one of our Productivity Centers, call **1-800-547-8362.**

*UNIX is a trademark of AT&T Bell Laboratories XENIX and MS-DOS are trademarks of Microsoft Corporation

SPERRY

Introducing an idea that makes obsolescence obsolete.

The UNIX* operating system from PC to mainframe.

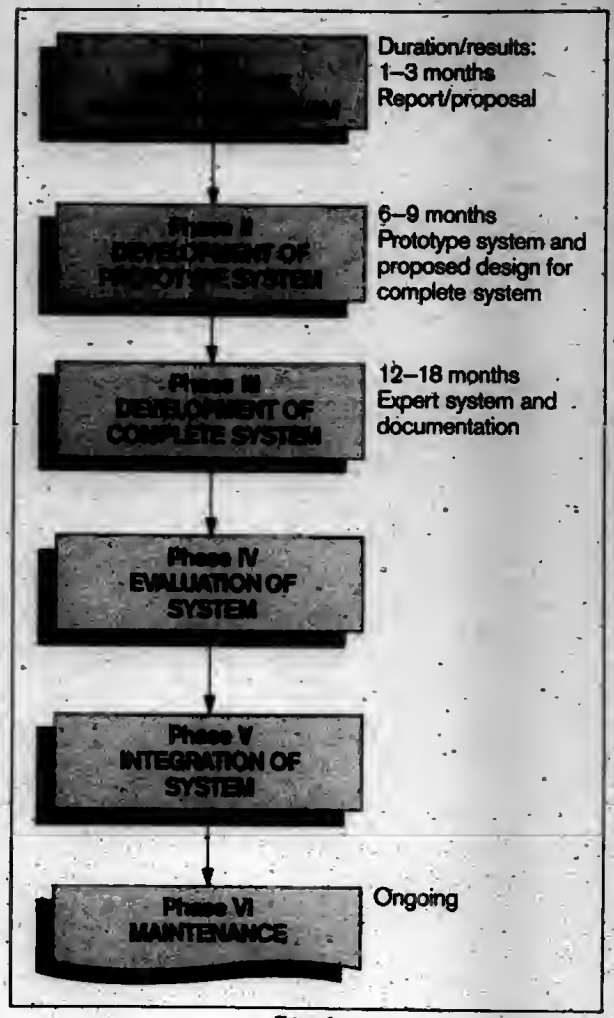


Figure 1

Phase VI: Maintenance of the system.

This sequence is, of course, not entirely fixed. In fact, later developments may yield insights that affect previous decisions, and some previous work may be revised. Similarly, the sharp conceptual boundaries suggested here may be blurred if additional evaluation suggests modifications after the system has been installed. A sequence of phases and activities is only provided to give you an overview of how an ideal project might proceed. Each step will be discussed in more detail below (see Figure 1).

Phase I: Selection of an appropriate problem.

The selection of an appropriate problem includes a number of activities that precede the actual decision to begin development of a specific expert system. It includes the following activities:

- Identifying a problem domain and a specific task.
- Finding an expert willing to contribute expertise.
- Identifying a tentative approach to the problem.
- Analyzing the costs and benefits of the effort.
- Preparing a specific development plan.

Choosing the right problem is perhaps the most critical part of the entire development effort. The technology is still quite limited. If an inappropriate problem is chosen, one may quickly find the entire effort bogged down in design problems that no one knows how to solve. Likewise, an inappropriate problem may result in an expert system that costs much more than it saves. Worse, a system may be developed that works but is unacceptable to users. Even if development is to occur internally, this phase is an especially appropriate time to obtain external advice to ensure that one's initial knowledge engineering project is well-selected and technically-feasible.

The near future will probably witness the development of a few large expert systems designed to solve major problems and many small knowledge systems designed to solve troublesome minor problems. Large-scale systems, because of the very large initial development costs, must necessarily focus on problems that are carefully selected to assure a large and rapid payback for their developers.

Developers of large-scale systems will, of course, be concerned with choosing problems that are amenable to existing tools, but they will also be vitally concerned with the economics of automating a particular type of

expertise. Small-scale systems, on the other hand, can be developed to demonstrate the application of knowledge engineering and the usefulness of tools. Wise developers will choose small tasks that are particularly onerous but quickly amenable to solution by means of a particular tool. Thus, projects for small-scale systems will be selected primarily on the basis of whether or not they can be solved quickly by means of a particular tool.

Many companies will probably choose to undertake small systems problems, using a particular tool, to experiment with knowledge systems before they undertake the development of a larger system.

The selection of an appropriate domain and task begins with a review of the likely domains in which an expert system might be utilized. If the knowledge needed to perform a task is stable, numerical and can be easily aggregated, then conventional, algorithmic computer programs will probably be the best way to solve problems in that domain.

Knowledge systems do not supplant the need for relational data bases, statistical and spreadsheet software or general ledger systems. On the other hand, if performance of a task depends on knowledge that is subjective, changing, symbolic or partly judgmental, the domain may very well produce a good candidate for an expert system embodying a heuristic approach.

Some small systems will be developed to solve problems that are amenable to conventional techniques simply because the users need the systems quickly. They decide that they can develop workable solutions by themselves using small knowledge system-building tools rather than waiting for their data processing groups to help them with their problem.

Each clue is an indicator that knowledge is scarce and that the wider distribution of knowledge would have value (see box). Expert systems distribute knowledge.

You are likely to think of many applications where a wider distribution of knowledge could be useful. The following guidelines help identify the subgroup of tasks that expert systems currently perform proficiently. Appropriate tasks have the following characteristics:

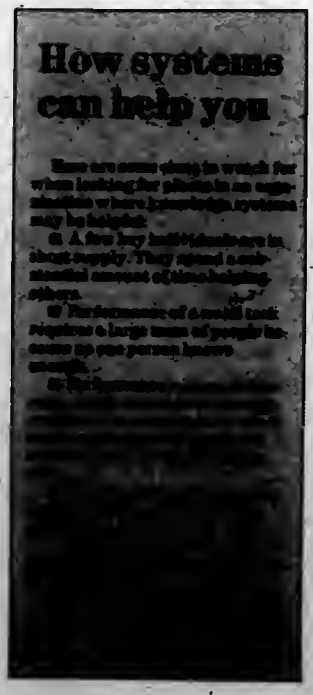
- Focus on a narrow speciality.
- Do not depend heavily on background knowledge or common sense.
- Do not require sensory discriminations. Symbols, not signals, are required.
- Are neither too easy nor too difficult for a human expert. The problem ought to take a human expert anywhere from three hours to three weeks to solve.
- Are defined as clearly as possible. The context in which the task is performed is described, and the user of the system is identified.
- Have outcomes that can be evaluated. That is, the relative success of the system's performance can be assessed.

Currently, commercial expert systems are most successful when they process symbolic information in relatively narrow domains. Like human experts, these systems do not excel on tasks that are poorly defined. Nor do they work well when outcomes cannot be evaluated.

Once a domain and task are identified, the scope is narrowed down further. It is useful to ask exactly what kinds of recommendations the system will make and to whom. Specific goals for the programming efforts must be identified. Some possible goals include formalizing an otherwise informal set of practices, developing a system that will allow the user to distribute scarce expertise, helping experts solve problems better or automating the routine aspects of an expert's job.

Finding an expert to contribute expertise. As we noted earlier, expert systems are developed by taking the specific knowledge of an established expert and putting it into a system. Small systems (and some very large systems) may incorporate the knowledge of more than one expert, but most expert systems reflect the knowledge and strategies of a single individual. Hence, finding the right expert is a key step in building an expert system.

One knowledge engineer we know says that "the expert you want is the one that the company would least like to give you. It's the person the company can least afford to do without." Throughout prototyping and



the later expansion of the system, the knowledge engineer and the expert will be working together. The knowledge engineer helps the expert structure knowledge and identify and formalize the important concepts and rules used to solve problems.

The expert should feel comfortable in explaining the nature of his expertise. In initial interviews, both the knowledge engineer and the expert will decide if they can interact successfully. Both parties will probably be working together for at least a year, so it is important that they establish a comfortable rapport.

Tentative approach

As the expert describes how the task is performed, the knowledge engineer will be thinking about various expert system development tools with which he is acquainted. The knowledge engineer characterizes the expertise in terms of a few broad kinds of knowledge representations and inference strategies that have been encountered when developing expert systems.

In this manner, the knowledge engineer begins to formulate an opinion about the likelihood that a particular type of expertise can be captured with an existing tool.

If it sounds as if a new tool will be required to create an expert system incorporating a particular type of expertise, the conscientious knowledge engineer will probably not recommend the project. However, a great many problems are amenable to the generic tools currently available.

Analyzing costs, benefits

Once a task has been identified as appropriate for expert system development, costs and benefits must be considered. Costs include the expert's time as well as the cost of the knowledge engineer. If the problem is a major one, both the knowledge engineer and the expert can be expected to spend at least a year on the effort. Additional costs will include acquiring a computing environment that is expensive in terms of both hardware and software.

Balanced against the cost are the benefits of the knowledge system. Those benefits may include reduced costs, increased productivity, enhanced products or services or even the development of new products and services. The relative costs and benefits of any particular system determine how long it will take for the system to pay back the development expense. Right now, most companies that develop large expert systems are choosing reasonably costly projects with very large benefits and, consequently, with very short payback times.

We can expect a trend toward less expensive products with slightly longer payback times as expert system development tools are refined. Figure 2 shows some of the resources required for various levels of expert system development.

Preparing a development plan

Once the knowledge engineer is convinced that a specific task can be performed by an expert system, the system can be built with an existing tool, an appropriate expert is available, the proposed performance criteria are reasonable and the cost and payback time are acceptable to the client, then the engineer is ready to prepare a specific plan to guide the subsequent development effort. The plan should give the rationale of the system, specify the steps to be taken in the development process and state the costs involved and expected results.

Phase II: Development of a prototype system.

Work on the expert system begins in earnest as the knowledge engineer and the expert work together to create a prototype system. The prototype system is a small version of an expert system designed to test assumptions about how to encode the facts, relationships and inference strategies of the expert. It also provides the knowledge engineer with an opportunity to engage the expert actively in the process of expert system development and, hence, to gain the expert's commitment to expend

Figure 2

the considerable effort involved in developing a full-scale system.

The development of a prototype system includes the following activities:

- Learning about the domain and the task.
- Specifying performance criteria.
- Selecting an expert system building tool.
- Developing an initial implementation.
- Testing the implementation with case studies.
- Developing a detailed design for a complete expert system.

Learning about domain, task

This phase begins with the knowledge engineer making an intensive effort to learn all he can about the domain and the task of the expert.

> *The knowledge engineer will ask the expert to think out loud and to explain the reasoning processes behind each decision.*

Usually, the knowledge engineer reviews documents and reads books to become familiar with the problem domain before beginning extensive interaction with the expert.

Once the knowledge engineer feels able to talk with the expert, he initiates a dialogue to define the task more precisely. At the same time, the knowledge engineer attempts to teach the expert to formulate his judgments in terms of heuristics and to elucidate his inference strategies.

The knowledge engineer usually asks the expert to identify four or five typical cases he has solved. The expert assembles all the documentation associated with those cases. The knowledge engineer listens while the expert describes how he approached each case and provides a step-by-step protocol for developing a solution to each particular problem. The knowledge engineer will ask the expert to think out loud and to explain the reasoning processes behind each decision.

In addition, the knowledge engineer may ask the expert to justify the reasoning he used when dealing with particular problems.

When possible, the reasoning processes the expert uses will be reformulated into rules of thumb. This helps the knowledge engineer clarify the expert's problem-solving procedure, and the heuristics will lead the knowledge engineer to identify the facts and relationships that are particularly important to the expert's reasoning.

As the knowledge engineer learns about the expert's problem-solving strategies and heuristics, he will be thinking about how similar heuristics and strategies have been incorporated in other expert systems. The knowledge engineer will ask questions in order to classify the knowledge structures and the inference strategies into one of several broad categories that are well-recognized by knowledge engineers. Among the questions the knowledge engineer will ask are the following:

- Is knowledge sparse and insufficient or plentiful and redundant?
- Is there uncertainty attached to the facts and rules?
- Does interpretation depend upon the occurrence of events over time?
- How is task information acquired or elicited?
- What classes of questions need to be asked to obtain the knowledge?
- Are facts reliable, accurate, precise (hard) or are they unreliable, inaccurate or imprecise (soft)?
- Is knowledge consistent and complete for the problems to be solved?

Specifying performance criteria

In the process of determining exactly what the expert does, the knowledge engineer will begin to refine the performance criteria by which the prototype system is to be judged. The performance criterion should be specified in unequivocal terms.

Perhaps the system will be expected to reach the same conclusions that the expert reached on five specific cases. Or, perhaps, the system will be expected to reach the same conclusions as five experts on five as yet unspecified cases under the typical conditions that the experts must work. Whatever the criterion, it must be specified so that a test can be conducted that will prove that the knowledge engineer has successfully completed his work.

At the same time, formulating a specific performance criterion will focus the knowledge engineer's attention on the precise nature of the initial conditions and the final output that the system will need to produce.

Selection of tool

As the knowledge engineer comes to understand the overall knowledge structure possessed by the expert and the inference strategies employed to manipulate the knowledge, he will decide which existing expert system tools will be used to develop a prototype system. The most important result of the prototyping exercise is ultimately a test of the adequacy of the chosen tool.

After choosing a tool, the knowledge engineer begins to develop a prototype version of the expert system as soon as the first case study is reasonably well understood. Subsequent cases are then tested, and as

each case is run, the knowledge engineer and the expert observe the reasoning of the system. They discuss why rules are or are not working as expected. Consequently, the knowledge base is revised in accordance with their refined understanding of the knowledge, heuristics and inference strategies.

Often the knowledge engineer will select a tool that matches the problem, and the prototype will be satisfactory, at least on the general level. The purpose of prototyping, however, is not to arrive at the final configuration for the expert system but simply to establish that a tool, a representation of the expert's knowledge and a strategy for drawing inferences are adequate for a task.

Once the knowledge engineer has built his initial prototype, the knowledge engineer and the expert work together to see how the prototype will function on a variety of case studies. These tests serve two functions. They allow the knowledge engineer to determine whether the formalisms used in representing the expert's knowledge are adequate to the tasks posed by the cases. They also allow the expert to see how an expert system uses the information he is providing.

The goal is for the expert to become more committed to the knowledge acquisition process by taking an active hand in testing the system. This is particularly critical because in the next phase of the development the expert will be asked to interact with the system to tune its performance.

Once the prototype is functioning in a satisfactory way, the expert and knowledge engineer are in a good position to assess what will be involved in developing a full-scale system.

If the original choice of objects and attributes is awkward, it must be modified. Estimates can be made about the total number of heuristic rules needed to create a complete expert system. Performance criteria can be stated with greater precision. All of this information, along with a plan, schedule and budget, is included in a design document that will guide the development of the complete system.

Phase III: Development of a complete system.

Once everyone is satisfied that the prototype system can perform as desired and that the design for the complete system will result in an expert system that will meet the specified performance criterion, the knowledge engineer and the expert are ready to begin the expansion of the prototype into a complete system. The development of a complete expert system includes the following activities:

- Implementing the core structure of the complete system.
- Expanding the knowledge base.
- Tailoring the user interface.
- Monitoring the system's performance.

Core structure

An adage popular among knowledge engineers is that it is usually best to throw away the prototype. Knowledge engineering tools support rapid prototyping with a low investment of time. Thus, at this stage it is common to rethink the basic design of the knowledge base.

By this we do not mean that you abandon a particular tool. We mean that the exact list of objects and attributes to be included in the system will probably change somewhat. Hierarchical relationships may need to be rearranged. The exact way in which inference is handled

> ***The goal is for the expert to become more committed to the knowledge acquisition process by taking an active hand in testing the system.***

is the heuristics may be modified as the expert and the knowledge engineer realize how the expert's knowledge and problem-solving strategies can be best represented.

Serious problems during the prototype phase may indicate that a different tool is needed. If so, the prototype phase must be repeated. Ordinarily, however, the prototype succeeds, but the initial representation of the rules and facts needs to be altered.

Consider an example. Imagine that we developed a prototype FACTORY MAINTENANCE ADVISOR structured around one central object: the manufacturing plant. Assume that the plant has several conveyor belts and several large compressor units of different types each needed to be maintained.

In the initial prototype, the knowledge engineer and the expert may underestimate the advantages of keeping general information about the conveyors and the compressors on intermediate objects and instead try to make both the conveyors and the compressors into attributes of the factory. As they work with the problem, however, the knowledge engineer and the expert may discover that conveyors and the compressors also need to be represented as objects.

As a result of prototyping, the knowledge engineer is in a good position to establish a basic framework for the complete expert system.

Tailoring the interface

Once the basic structure of the expert system is established, the knowledge engineer attends to the development and tailoring of the interface with which the system will actually deliver information to the user. Considerable attention is given to introducing phrases and explanations that will make it easy for the user to follow the logic of the expert system. The system should make it easy and natural for a user to inquire about any details he may desire. Graphics representations may be particularly helpful. Likewise, displays that allow the user to follow the system's reasoning process may be a key to selling the system to the users.

The main work of the third phase is the addition of a very large number of additional heuristics. These heuristics typically increase the depth of the system by providing more rules for handling subtler aspects of particular cases. At the same time, the expert and the knowledge engineer may decide to increase the breadth of the system by incorporating rules that handle additional subproblems or additional aspects of the expert's task.

A good tool provides a knowledge engineering interface that allows the expert to run cases to inspect the system's reasoning. The interface allows the expert to step through a case asking why particular rules were fired or not fired and thereby identifying those points in which additional, specific knowledge is needed to allow the system to reach the appropriate conclusion.

By this point in the process, most experts have learned enough about the entry of rules that they can enter new rules into the system by themselves. Thus, this is the beginning of the process during which the knowledge engineer begins to transfer the ownership and control of the system to the expert to polish, elaborate and ultimately maintain without the support of the knowledge engineer.

Phase IV: Evaluation of the system.

When the expert and the knowledge engineer are satisfied that the expert system is complete, the system should be tested against the performance criteria that were agreed upon at the conclusion of the prototyping phase. This is also the time when other experts are invited to try the system and to present it with new cases.

IN DEPTH/ENGINEERING EXPERT SYSTEMS

Phase V: Integration of the system.

The next phase in the expert system development process involves integrating the expert system into the work environment in which it will operate and providing training for those who will maintain it.

By integration we mean to include all of those procedures necessary to make a new expert system work with the existing systems within a company. We do not mean to include making significant changes in the expert system. If, after the expert system is put in use, it is determined that major changes are necessary, then one must simply go back to the prototyping or the development phases and make those changes. Such changes invariably involve a knowledge engineer or someone else who can change the code of the system. By integration we mean developing linkages between the expert system and the environment in which it operates.

The integration of an expert system is usually undertaken by the expert and systems personnel associated with the users of the system.

Activities during this phase might include:

- Arranging for technological transfer.
- Interfacing the system with other data bases, instruments or other hardware.
- Enhancing the speed or friendliness of the system.

When the expert system is ready, the knowledge engineer must ensure that the experts, users and systems personnel who will use and maintain the system understand it. Once he has accomplished this transfer of information and technological know-how, he is ready to withdraw from the project, leaving the system in the hands of its users.

Every company environment will offer a different challenge to those who are responsible for preparing company personnel to accept and use an expert system. Experience to date seems to indicate the experts are quick to accept the system once they are convinced that it will give useful advice. Convincing experts of the system's usefulness involves having each company expert present cases to the system and seeing how the system performs. A critical aspect of acceptance is positioning the system as an aid to free experts from onerous tasks rather than a way of replacing experts.

Convincing nonexpert personnel to accept the system involves all of the problems and challenges associated with the introduction of any new system into a company environment. Success depends on careful planning, lots of communication, appropriate opportunities for all affected parties to talk about the change and good support once the system is in place.

Other goals of an integration effort involve interfacing an expert system with existing data bases and other company systems. An expert system may need to acquire information from instruments or other hardware that will provide input for the system. Still other goals include enhancing time-dependent factors in the system to make it run more efficiently or quickly or enhancing the physical characteristics of the hardware if the system is to run in unusual environments.

Puff, the small pulmonary diagnosis system used at the Pacific Medical Center in San Francisco, is a nice example of a system that has been well-integrated into its environment. After Puff was completed and everyone was satisfied that it performed as it should, the system was recoded from Lisp to Basic. Once Puff had been recoded, it was transferred to a Digital Equipment Corp. PDP-11 computer that was already being used at the hospital. This computer, in turn, was connected to the pulmonary measurement instrument.

Thus, as it now stands, a patient breathes into a pulmonary machine, the data from the pulmonary machine is fed directly into the minicomputer, Puff processes the raw data and prints out a recommendation for the physician. The physician is not required to interact with Puff at all. The system is fully integrated

into its environment: It is simply an intelligent extension of the pulmonary machine that the doctors have been using for years.

Another system that has been integrated into its environment is General Electric Co.'s Cats-1 expert system for diagnosing diesel locomotive malfunctions. This system was initially developed in Lisp and then translated into Forth so that it could be run more efficiently in various locomotive shops. A repairman can interact with the system to determine probable causes of diesel malfunctions. The system is integrated with a videodisk and a video terminal to provide visual explanations for the repairman about particular checks that he might need to make.

In addition, if the operator is not sure how to fix a problem, the system will locate training materials that have been previously developed by the company and show them on the video terminal. Thus, the repairman can use the expert system to diagnose a problem, to verify the exact test procedure that he should use, to obtain a video display that explains how to make a test or to obtain instruction related to the problem he is diagnosing.

Phase VI: Maintenance of the system.

When a system is translated into a language like Basic to facilitate speed and portability, the flexibility of the system is sacrificed. This is acceptable if the system has captured all of the knowledge in the task domain and if the knowledge is not going to change in the foreseeable future. If, on the other hand, an expert system has been designed precisely because the task domain is changing, you will want to maintain the system in its tool environment and provide for an ongoing maintenance activity.

A good example of an expert system that has been implemented in this manner is Xcon, the expert system that DEC uses to configure new VAX computers. One of the key problems DEC faced was the continuing changes necessitated by new equipment releases, new specifications and so on. Thus, DEC keeps Xcon in the OPS-5 environment. There is an expert whose job involves adding new information and modifying rules in Xcon's knowledge base to keep it current. The highly modularized nature of rule-based systems makes the weekly modification of Xcon feasible and assured DEC that Xcon's recommendations are always current.

This description of developing a large expert system has only begun to describe the process. The keys to the process are the knowledge engineers and the choice of an appropriate problem. The knowledge engineer must understand how to work with one or more experts to identify and formalize their knowledge and inference strategies. The knowledge engineer must also understand the tools and programming environments available in order to select the right match between the knowledge and the implementation tool.

In addition, the knowledge engineer must have the social skills to obtain the active support of the expert and, ultimately, of the users of the system. In most cases, the task is more than one person can handle, and a team of knowledge engineers will need to be assembled.

Since few knowledge engineers have the breadth of experience to determine what problems a company should address first or the organizational insight to understand the politics of orchestrating a major organizational transition, skillful project managers and outside consultants will be necessary for most companies attempting to develop their first large expert system.

About the authors

Paul Harmon is a consultant who specializes in helping companies solve human performance problems. He has assisted Teknowledge, Inc. with the development of workshops to introduce managers and programmers to knowledge engineering.

David King is a senior knowledge engineer at Teknowledge. He teaches clients to use M.1, a personal computer-based expert system building software tool.

IN DEPTH

Users talk back

A palatable copy protection scheme, an alternative to Dbase II, transparent interfaces — are they too much to ask of software vendors? Here's what users in an electronics company, a bank and an accounting firm say they're looking for in the marketplace.

Jonathan Yarmis

I am the personal computer analyst at General Instrument Corp. You might better recognize General Instrument as the company that owned most of Sytek, Inc. General Instrument is the industry leader in cable TV electronics (through its Jerrold division), wagering systems (Amtote) and programmable electronic circuits. The company's primary strategies are directed toward communications systems and computer-related products.

At General Instrument, my duties include maintenance of the corporate recommended software list. While we call it a recommended list, it is tantamount to a corporate mandate. That's because we've proven to our end users that the level of our support and the quality, accuracy and timeliness of our recommendations merit this consideration.

That obviously imposes quite a responsibility on me to be right.

Imagine, if you will, a Fortune 500 company tracking its entire employee stock option system using an IBM Personal Computer AT part-time. The machine is also used for communicating with the mainframe, preparing Securities and Exchange Commission reports and miscellaneous other personal computing activities. Now, imagine a software package whose inadvertent or even — God forbid — authorized use may trigger "booby traps that will make Vietnam look like a birthday party."

Yes, that's utterly absurd, yet that was the claim made by Defendisk Vice-President Craig McClure about an upcoming version of his company's product [*Infoworld*, Nov. 19, 1984].

Those booby traps could have included

(Continued on ID/14)

ILLUSTRATIONS BY HENRY FUNG

Ken Edwards

As a management consultant, I welcomed the multitude of innovative microcomputer products that allowed the application of computers to business problems at almost every level. As an information scientist, I have to admit that I was worried about the first generation of hardware, software and documentation to be placed directly into the hands of end users, lest their first exposure to the wonders of computing become their last.

Somehow, despite many individually trying experiences, the group application of personal computing to the knowledge worker's job is now virtually assured. The challenge we now face in the industry is to fulfill the promise of increased productivity and enhanced quality that was used to justify equipment currently in place. Then we can go on to add new systems to the office landscape. Unfortunately, manufacturers and publishers in the industry have not been terribly responsive or, in many cases, even attentive to end-user needs.

To set the stage, we now have a third and largely incompatible sphere of information processors that joins the mainframe and minicomputer-based data processors and office automation systems.

Moving an editable memo from a microcomputer-based word processing program

(Continued on ID/20)

Dennis Bradley

The banking industry has undergone major changes as a result of deregulation, with more still to come. Banks, by tradition, are conservative yet very competitive. Deregulation now allows the banking industry to be flexible in the kinds of services that can be provided to meet existing customer needs and attract new customers.

The pressures on banks to deliver new services, coupled with new technology, places a high demand on the kinds of software used by banks. Because of bankers' conservative nature, there is a reluctance to subscribe to new software products that exhibit instability.

Service departments that do high-volume bond trading, electronic funds transfers, cash management and other customer-related services need instantaneous processing and inquiry capabilities. Banking systems require high-volume transaction throughput, which has created a need for relational software systems that are

(Continued on ID/20)

Yarmis

(Continued from ID/13)

modifying the operating system, data — even reformatting an entire hard disk. Similar claims were made for Vault Corp.'s Killer Prolok.

I hope these are only publicity stunts by attention-starved companies. If so, I regret having even graced those companies with my attention. But if they are not stunts, let me categorically state that we will never endorse or purchase a program that employs this form of copy protection.

The stock option scenario I painted is a real application at General Instrument. If we were to miss an SEC reporting deadline because of the accidental erasure of our hard disk, I can only imagine how our lawyers would react! They're probably drooling to be involved in a landmark case like that.

Nor will this system make existing forms of copy protection more palatable. Our hard disk users don't want to be bothered with the nuisance or unreliability of floppy disks. Surely someone can come up with something better than laser-etched master disks, hardware keys or the like. A palatable copy-protection scheme has yet to cross my desk, other than no copy protection scheme. The impending proliferation of local-area networks is going to force changes. But Killer Prolok is not the answer. They're not serious, are they?

How do I evaluate a software package? I'd be lying if I said marketing isn't a major consideration. Lotus Development Corp.'s Symphony, for example, commanded my immediate attention because of TV ads — I said attention, not purchase. We certainly looked at Symphony and even endorsed it — but not as a replacement for 1-2-3. Symphony is not a replacement for 1-2-3 — it's a different category of program, and its market is limited.

Back to marketing, though. Another good example is Enable from The Software Group. Even though the company has done nothing else, to my knowledge, its splashy ads and generous trial offer will result in my looking at the package. Again, though, looking — not necessarily purchasing.

> ”
>
> *Answer the question, "Who would use it?" and you've gone a long way toward answering the question, "Will I buy it?"*

Track record

Another factor that will cause me to look is the track record of a company. Not too many [have a track record yet], which probably serves to magnify the value of it for those that do. When something gets so easy that everybody can do it, everybody usually does. Microsoft Corp.'s track record alone caused me to look at Project, and the product didn't disappoint me. It's a workmanlike package, though far from the ultimate. Again, look — not buy.

So why do we buy? The reason is really quite simple, and it's not "because everyone else is buying" — at least not most of the time. It's because these personal computers and software enable us to do a job or help us do it faster and/or better.

We draft letters — a word processor speeds the revisions. We add columns of numbers — a calculator can do that. But we change those numbers — enter Visicalc. But what about the trusty calculator? Bring on Sidekick (Borland International, Inc.). These are examples of software that fulfill a need. They're big sellers. Equation manipulation? Not so big. However, some of you might have taken a bit of a bath on TK Solver, Software Arts' successor to Visicalc.

Answer the question, "Who would use it?" and you've gone a long way toward answering the question, "Will I buy it?"

A powerful yet easy-to-use alternative to Dbase II has yet to establish itself. Ashton-Tate's marketing clout and dominant market position continue to reinforce the Dbase mystique.

FOR PEOPLE WHO THOUGHT THEY'D NEVER MEET THE PERFECT 10

We've got one to knock your socks off. The StarWriter™ F10 from C.Itoh.

What sets this daisy wheel apart is its fabulous figure of 58 letter perfect characters per second, at a price of up to $1,000 *less* than other leading printers in its class.

It's compatible with most of the popular PCs and offers a full line of accessories, including a cut sheet feeder and tractor feed.

And like the rest of C.Itoh's printers, the F10 acts without acting up.

It has been thoroughly tested and proven on the job to assure reliability. Plus, you get a full year's warranty, backed by over 350 authorized service centers coast to coast.

The F10 is one hot printer for the money. But that's not surprising when you consider that C.Itoh's been producing superior printers for over a decade, thanks to the strong backing of our 126-year-old parent company with over $60 billion in sales annually.

Little wonder C.Itoh printers are the best selling printers in the world.

To meet your Perfect 10, just see your local C.Itoh dealer. Or for more information, call toll free 1-800-423-0300.

Or write C.Itoh Digital Products, Inc., 19750 South Vermont Avenue, Suite 220, Torrance, CA 90502.

™ StarWriter is a Trademark of C. Itoh Digital Products, Inc.

C.ITOH
Printers

> ***The technology for voice isn't there yet, and besides, it requires some attitude adjustments and does not reflect the way we work today.***

But it's kind of like the emperor's new clothes — nobody will point out that Dbase is far from the perfect program for most applications. I dare say, though, that well over half — yes, much more than 50% — of our Dbase users would be better served by another product. For instance, many of our end users have been well served by Datease [Software Solution].

We're also looking for the ultimate (and reasonably priced) project management package, computer-aided design package and presentation graphics product. But I don't think there's a "next Visicalc" hiding out there. First, I don't see a widespread need that's unaddressed. The technology for voice isn't really there yet, and besides, it requires some attitude adjustments and does not reflect the way we work today.

Also militate against the next Visicalc is the speed with which clones now come to market. Visicalc grew up in a vacuum. But take the desktop utilities such as Sidekick. A year ago — nothing. Now there are at least half a dozen.

Anyone, given a year's lead, could have dominated this potentially large market. But none got that time, and one-sixth or one-tenth of Visicalc's sales, while maybe a success, is not a blockbluster.

Missing the boat

Beyond functionality, users are demanding ease of learning and ease of use to go with their power. I think many market researchers are missing the boat. It is clear to me that the early personal computer users in General Instrument are often the high-tech types — the guys who went out and bought a four-function Bowmar calculator for its original $100. Many of the technologically shy — who can no less benefit from the power of a personal computer — are still waiting on the sidelines.

What do I consider essential in this area? On-line Help is a must. Lotus established a tough standard with its comprehensive, context-sensitive Help screens; it's the standard by which we measure everything. This Help in no way substitutes for a proper and well-indexed manual, but most users will go to Help screens first and may only skim through the manual.

Nevertheless, a well-written manual full of examples and good technical reference is a must. And without a good index, the effort is almost worthless. A disk-based tutorial is nice but not essential; a lot of users ignore them anyhow.

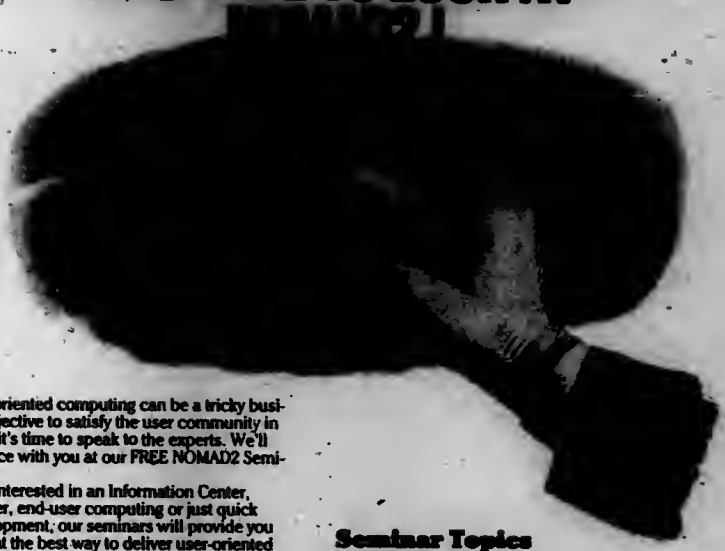
Finally, an easy installation program supporting a wide variety of hardware options is a must. If the only printer you support is an IBM graphics printer, we're not interested.

Another pet bugaboo is those programs that don't support a black-and-green monitor hooked up to the color graphics adapter. Again, that leaves out some users.

On the other hand, users are not idiots. Programs that insult their intelligence or sacrifice functionality for ease of use will not get widespread use. I was discussing this with some people the other day, and none of us could name anyone who uses PFS:Report. I read that Software Publishing, Inc. sells a lot, but I still don't know where.

Vendor, manufacturer and third-party support all are important, too. Part of the success of Dbase vs. several comparable products is in the support it receives from third parties like Fox & Geller and from the way dealers support it. Most

USER-ORIENTED COMPUTING? IT'S TIME TO LOOK AT NOMAD2



Delivering user-oriented computing can be a tricky business. If it's your objective to satisfy the user community in your organization, it's time to speak to the experts. We'll share our experience with you at our FREE NOMAD2 Seminars.

Whether you're interested in an Information Center, Development Center, end-user computing or just quick applications development, our seminars will provide you with a closer look at the best way to deliver user-oriented computing.

NOMAD2 is a unique product, created by D&B Computing Services, an information services company of The Dun & Bradstreet Corporation. For 16 years we have been delivering value-added, user-oriented computing services.

We not only deliver NOMAD2, the premier fourth-generation language under MVS, VM and the XT/370 but we also provide . . .

- A Comprehensive Training Program for Your Information Center Staff
- An in-depth End-User Training Program
- Complete End-User Documentation and Training Materials
- Technical Support for Your Information Center Staff

NOMAD2 contains ALL the components you need to successfully provide user oriented computing services.

Seminar Topics

Delivering User-Oriented Computing

- Information Centers vs. Development Centers
- The "Ideal" Environment
- User Profiles
- Delivery Strategies
- User Training and Support
- Microcomputer Strategies

NOMAD2: Online Application Development

See the "reality" of user-oriented computing with NOMAD2. Watch us build and dynamically modify a NOMAD2 application, online. We'll build a database structure, load data, generate reports and graphics, modify the database and much more.

If delivering user-oriented computing is your objective, it's time to take a closer look at NOMAD2.

NOMAD2: AN INNOVATION IN END-USER COMPUTING FROM DUN & BRADSTREET

FREE NOMAD2 Seminars

(Half-Day Sessions)

Philadelphia, PA	March 20	Portland, OR	May 9
St. Paul, MN	March 27	Fort Worth, TX	May 9
Cincinnati, OH	April 3	Los Angeles, CA	May 9
Des Moines, IA	April 3	Wichita, KS	May 9
Columbus, OH	April 4	Boston, MA	May 10
Pittsburgh, PA	April 9	Stamford, CT	May 14
Chicago, IL	April 9	Oklahoma City, OK	May 14
Cleveland, OH	April 10	Denver, CO	May 15
Troy, MI	April 11	Omaha, NE	May 15
Milwaukee, WI	April 11	Tulsa, OK	May 15
Calgary, AB	April 24	Seattle, WA	May 22
Dallas, TX	April 24	New Orleans, LA	May 23
Vancouver, BC	May 1	Montreal, PQ	May 24
Houston, TX	May 1	New York, NY	June 5
St. Louis, MO	May 2		

NOMAD2 is a registered trademark of D&B Computing Services, Inc.

D&B Computing Services

a company of The Dun & Bradstreet Corporation

Please fill out the attached registration form and return it to:

Roger Cox
D&B Computing Services
187 Danbury Road
Wilton, CT 06897
(203) 762-2511

☐ Please reserve _____ seat(s) at a *FREE* NOMAD2 SEMINAR to be given in (City) _____ on (Date) _____.

☐ Please send NOMAD2 materials.

Name _____ Position _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

THE PANASONIC SR. PARTNER NO PERIPHERALS NEEDED

Panasonic
Industrial Company

IN DEPTH/USERS TALK BACK

dealers, it seems, have a Dbase consultant or two on staff. That's good. We corporate users will pay for some levels of support. But keep it reasonable.

In one case, a very large dealer quoted a user $75 per hour to show her how to use a font cartridge for the [Hewlett-Packard Co.] Laserjet printer. We paid a school kid $50, and she wrote a menu-driven program for the whole printer.

> ❞
> *When the big story is that Lotus did meet an announced deadline, something is wrong.*

Back to software. Since it seems nine out of 10 software packages are nowhere near final when released, upgrade policy is important. I use a lot of software on a regular basis, and none of it is revision 1. Free or cheap upgrades are a must.

Finally, consider the training element. In the old days of 64K-byte random-access memory [RAM] and 140K disk storage on the Apple II Plus, software authors often had to sacrifice form for substance. Just wait, they said: When we get more memory and more disk storage, we'll have room to build powerful programs so easy to use that even Bonzo the chimp could be a computer expert.

Anyhow, with notable exceptions, this has been slower to develop than I would have hoped. Tempted by the availability of 256K RAM and up, programmers have given us more power but, with it, more complexity. As a result, we are finding enormous demand for formal training from our users.

In recent whistle-stop visits to three of our locations, I was asked to come back — soon — for formal training sessions. Dealers are in a good position to provide this training to us.

Our volume and costs do not yet justify a formal training center. For dealers, it can be a profitable venture — but don't treat it like a golden goose. I've sat in on too many training sessions during which it seems the instructor is only days ahead of his pupils and/or doesn't have a grasp of what businesses use personal computers for. That's about all you can expect from $5-per-hour help, and that won't get you our business.

We *will* pay good dollar for quality. You have to convince us you can do a better job than we can in-house. Mostly, I remain unconvinced. Nevertheless, dealer training programs are a definite consideration, especially in top-end software. Competitors to Symphony and Framework cannot succeed without dealer support — period.

Notably absent from my discussion is any mention of price. As long as individual software packages remain less than $800, price is not a factor.

When you're talking about Primavera Project Planner [Primavera Systems, Inc.] in the $2,500-plus range, it's a definite factor. But we'll pay good dollar for good programs.

While it sounds funny to have to say this, I won't even take into the decision-making process undelivered products or features. When the big story is that Lotus *did* meet an announced deadline, something is wrong.

In this regard, the software industry is an embarrassment, and I refuse to laugh it off as business as usual. In Fortune 500 companies, we want to do business with companies that share our sense of professionalism and proper business conduct.

There is really just one overriding question — the only question I ask myself when I evaluate software: Would I use this product?

About the author

Jonathan L. Yarmis is the personal computer analyst at General Instrument Corp., Clifton, N.J.

Edwards

(Continued from ID/13)

to the office information system or trying to extract information from the corporate data base to fill a microcomputer-based spreadsheet is still the subject of articles, not products.

Software products seem to have been used to help define rather than respond to the needs of the knowledge worker. End users and their consultants often think of a business problem in terms of the constraints of microcomputer software they hope can help solve it.

The unsophisticated user's needs have been totally missed. As an example, if, after turning on his micro, a person sits and waits for the system to instruct him in what to do, he will eventually be placed into the Basic interpreter on many systems. This assumption is totally wrong in almost all cases. What could the manufacturers have been thinking?

Some frustration

By and large, product managers and their engineers rather than end users and their consultants are designing microcomputer products. The frustration that has occurred with hardware such as keyboards, monitors, printers, cables and lack of standardization in software has alienated a number of people in the industry.

Some suggestions:

■ Be innovative. The industry is tired of product clones. Just because a major manufacturer or publisher has designed a product one way does not imply there are not better ways to design it or that the product will even meet market acceptance. Even if it does, clones generally have a tough time against the competition.

■ As soon as a new product idea is born, check it out with focus panels, previous beta test sites, consultants and/or market researchers. You don't have to commit yourself to produce the product at all. People in the marketplace will certainly relate to your interest in their needs, and they may surprise you with their enthusiasm.

■ Explore the needs of end users periodically without a product in your hands. Get involved in user groups, host roundtable discussions and attend industry conferences. Invite consultants to hear their product wish lists. They will represent a composite of many clients' needs.

While U.S. firms are not yet particularly impressed with most of the Japanese products to be sold here, their products are improving. What is particularly impressive about the Japanese is their approach to understanding the needs of the U.S. marketplace. They generally come to listen, they take notes, and they earnestly try to respond.

Sooner or later, this is going to make them tough competitors if they begin to read the U.S. marketplace better than U.S. firms have. We have already seen this happen in the dot matrix and now the laser printer industry.

About the author

Ken Edwards is a manager with the executive office of Touche Ross & Co. in New York. He has 15 years of consulting experience and currently oversees the firm's microcomputer support center.

Bradley

(Continued from ID/13)

and can be linked to other on-line data bases.

The pressure users are experiencing results to a degree from the rapid changes occurring in mainframe and microcomputer technology. User support systems must be continuously updated to reflect the current business environment. Traditional mainframe systems that typically took two years or longer to build have a life of approximately five years, if that long.

Businesses, both small and large, are looking at micro or personal computers as a solution to their problems. There is an infusion of supposedly easy-to-use off-the-shelf software that solves these problems.

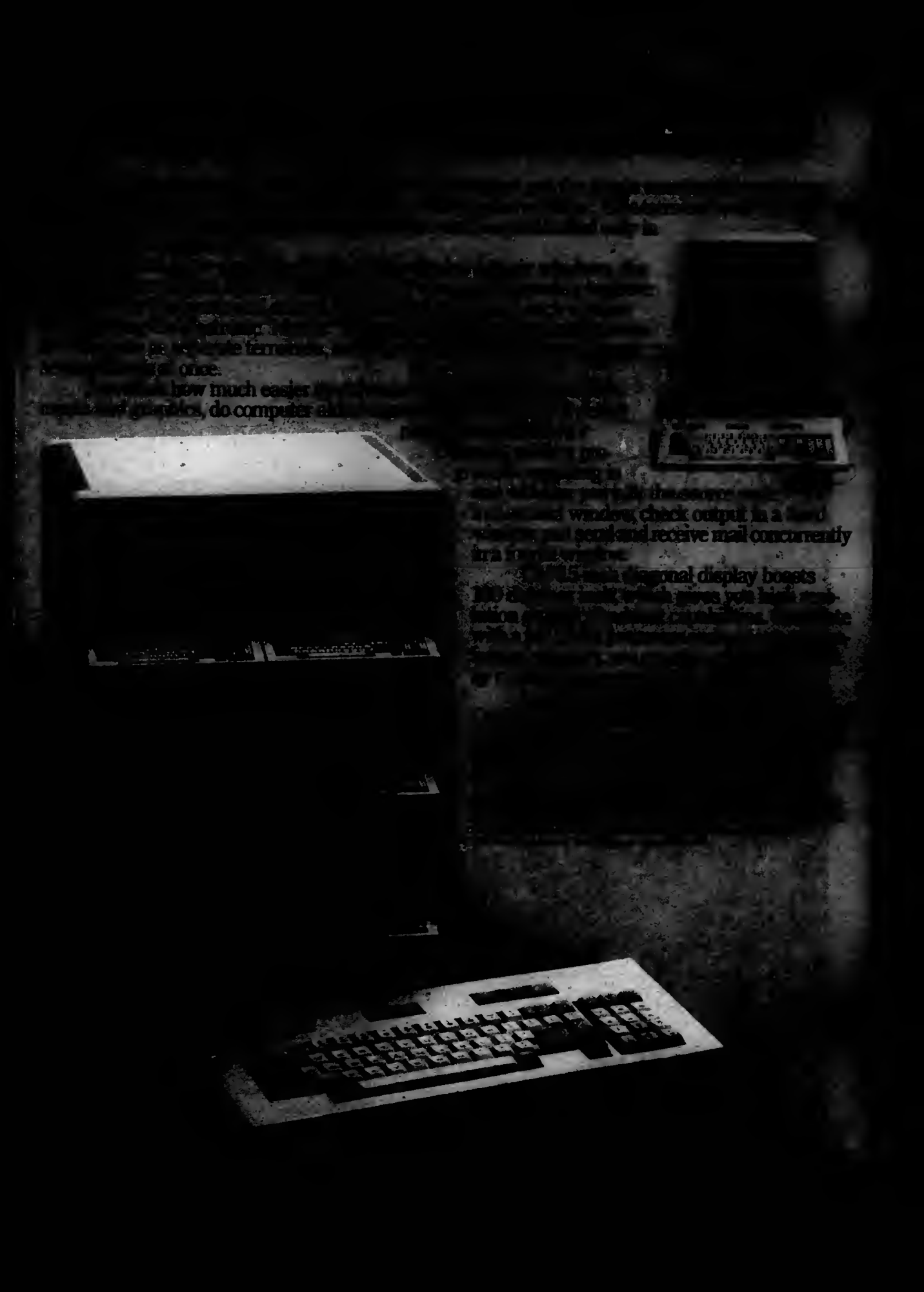
Users are requesting more software flexibility. They want and need the ability to capture and manipulate data easily using user-friendly (menu-driven) software. Users have already been the recipients of significant hardware improvements — more raw computing power, increased storage capacity and faster throughput. But software technology is lagging far behind the productivity advancements made in hardware.

Whether developed internally or attained through second- or third-party vendors, users continue to search for more powerful and efficient software. Even with the gains already made in new software enhancements, there is still a prevailing need for software to become less costly, relatively easy to maintain and able to handle large volumes of data quickly.

There are some vendors who do not thoroughly test their software; consequently, the user has to suffer with unwarranted system problems. This damages vendor integrity, to say the least. Also, accompanying system documentation must be better prepared.

Users with microcomputers often need to access data from the mainframe. But microprocessors are not capable of housing large quantities of data or complex data base structures. Current software packages preclude this from being a trivial task. There are a few software packages that make downloading of data from the mainframe simple. User communication to large data bases additionally requires technical expertise by someone who is familiar with complex data structures.

Microcomputer-based technology is causing the way that we conduct



> ***Anticipating user needs is practically impossible. To lessen the gap, the lines of communication between software developer and user need to be strengthened.***

business to be looked at in a different manner. Software for the micro is relatively inexpensive compared with development costs for mini or mainframe applications.

Micros have created a new perspective on software development. A lot of micro software is being developed in basements or garages. Many of these third-party software entrepreneurs are inexperienced. This is not to say that good software isn't being developed; the point here is that this software tends to be developed from an individual's own concept of a business need rather than against a specific business requirement.

Companies tend to look toward the more established leaders for micro software — Microsoft Corp.'s Multiplan, Lotus Development Corp.'s 1-2-3 and Micropro International Corp.'s Wordstar, for example. Several off-the-shelf micro software packages can be easily customized to the user's needs, but the problem is that many software vendors are incapable of providing support.

More query and fourth-generation languages are becoming available. We are also seeing report generators that are much more powerful and even more user-friendly. But for the more experienced technical user, there is still a need for software that makes data communications across hardware interfaces transparent.

Software vendors are finding it increasingly difficult to hone in on user requirements. Business requirements are changing at such a rapid pace that systems are becoming obsolete soon after they are installed. This is especially true for the banking industry.

Anticipating user needs is practically impossible. The lines of communication between software developer and user need to be strengthened. User group forums provide an excellent vehicle for communication. Examples include Guide, which is geared to IBM products, The IV League (formerly Mark IV Users Group), Tandem Users Group and the American Bankers Association conferences. From forums such as these, new products and product enhancements have evolved. Computer manufacturers such as Digital Equipment Corp. and Tandem Computers, Inc. have found success following IBM's lead.

Enormous gains are being made in the number of application, report and graphics generators and fourth-generation languages being developed. These software aids are employed by nearly everyone — engineers, managers, end users and programmers.

Some of the more experienced software vendors are reaching out to businesses. For example, First National Bank has assisted in beta tests and prototyping projects.

Software integrity is a key element to the bank's acceptance of both software and hardware systems. Software integrity remains a question mark in the eyes of bankers.

The bottom line is that vendors need to be more responsive to user needs. New software is only the tip of the iceberg. Documentation must no longer occupy the back shelf. Developers must develop systems with the user in mind. Development costs must come down as micro and mainframe systems become integrated.

About the author

Dennis Bradley has worked in data processing for 15 years. He currently is systems officer/project manager of the Quality Assurance Program at First National Bank of Chicago.

#1 In A Series: Setting Standards in Mainframe Applications Software.

Fifteen Years Ago Software International Created The Mainframe Applications Software Industry. Today We're About To Change Its Course.

Fifteen years ago packaged software was an idea. Today it's an industry. Unfortunately, it's an industry that's never proposed a set of standards for itself... never spoken clearly to its customers about standards for product architecture or service or support... never put into words the standards that characterize a true level of professionalism in a software vendor.

That is until now.

Enter Software International.

Fifteen years ago we brought our first financial software package to the marketplace. Since then we have installed more than 5000 packages. And now, as a member of the General Electric family of companies we feel we are in a position to speak out and help chart our industry's course for the next fifteen years.

We've put our thinking into a 35-page white paper "Setting Standards in Mainframe Applications Software." We'll send you a copy at no cost.

The paper presents 16 topic areas that we believe to be critical to the long term success of applications software installations... important ideas for those who purchase or recommend applications packages.

It talks about the coming generation of architecture for software products and what that means to you... it suggests the kind of installation, support and service a user should expect from his software vendor.

Whether you're developing your own software, or evaluating a package, you'll want a copy of this timely report. It'll give you new insight into the direction the mainframe software industry is heading.

And a fresh look into the thinking that goes on here at Software International.

For a copy call 1-800-343-4133, in Massachusetts 1-800-322-0491.

Software International Corporation
One Tech Drive
Andover, MA 01810

Dear Sirs: Please send me a copy of "Setting Standards in Mainframe Applications Software."

Name/Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Phone _____

CW3

SOFTWARE INTERNATIONAL

Software Thinking That's Impossible To Ignore

CAN YOU PASS THE TEST 9 OUT OF 10 VM DATA CENTERS FAIL?

IF NOT, YOU NEED THE VM SOFTWARE SEMINAR.

From your own experience, are the following statements true or false? Be honest!

T	F	
☐	☐	There has never, ever, been a security problem in my organization.
☐	☐	Our accounting system automatically bills for system usage, and no one ever complains about the charges.
☐	☐	We never have sudden crunches in our workload, and we never need more disk space than we have.
☐	☐	Overnight tape backup is quick, easy, and totally error-free.
☐	☐	Running a VM data center isn't half as tough as it's cracked up to be.

If you answered "False" to more than one of the questions at left, you'd better sign up for a free VM Software Seminar right away. It's the quickest, easiest way to find out how to eliminate the major problems of VM data centers—and save time.

AGENDA

8:30 am	Registration/Coffee
9:00 am	Taking Charge of your Data Center
10:15 am	Break
10:30 am	Specific Needs, Specific Solutions
12:00	Complimentary Lunch
1:00-3:00 pm	User Workshop (non-users welcome as well!)

WHAT YOU'LL SEE

Each half-day seminar gives you the inside story on VMCENTER—the only comprehensive utility system designed specifically for the VM environment. You'll also see VMCENTER components covering system security, directory maintenance, resource scheduling and accounting, and disk and tape management. And you'll have a chance to talk with current users in a unique workshop setting.

WHO SHOULD ATTEND

VM data center managers and system programmers, security administrators, capacity managers; VMSI product users and non-users alike.

WHAT IT COSTS

Nothing. Even the lunch is free.

WHO'S THE SPONSOR?

VM Software, Inc. (VMSI)—the leading independent vendor of system software for the VM marketplace.

SEMINAR DATES AND LOCATIONS

Atlanta, GA May 13	**Montreal, PQ** April 25
Boston, MA April 16	**New York, NY** May 7
Chicago, IL April 16	**Philadelphia, PA** May 8
Cleveland, OH April 15	**San Francisco, CA** May 15
Dallas, TX May 2	**Somerset, NJ** May 9
Denver, CO April 29	**St. Louis, MO** April 22
Detroit, MI May 20	**Stamford, CT** April 29
Houston, TX May 1	**Toronto, ON** May 21
Los Angeles, CA May 13	**Washington, D.C.** May 3
Minneapolis, MN May 21	

CALL (703) 821-6886 FOR IMMEDIATE ENROLLMENT

VM Software, Inc., 2070 Chain Bridge Rd., Suite 355, Vienna, Va. 22180 1-CWX-0886

COMMUNICATIONS

Amdahl lineup grows in spate of unveilings

ATLANTA — Amdahl Corp. unleashed a flurry of products at the recent Interface '85 communications conference here.

The announcements included the following: the Financial Communications System Network Architecture-to-X.25 (FCSTX) support package for financial applications; the addition of remote job entry (RJE) support for its 4460 network concentrator; an entry-level, time-division multiplexer for small- and mid-size networks; multitrunking and hub management enhancements to its line of time-division multiplexers; and upgraded AT&T-compatible data sets.

The FCSTX package is said to enhance the Amdahl 4470 Network Concentrator to provide expanded service to banks and other financial institutions using X.25 networks.

Enhancements enable the 4470, a Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC)-to-X.25 concentrator, to provide network concentration and protocol transformation for both the IBM 3600 and 4700 Financial Communications Cluster controllers, the

See WARES page 66

Industry backs MAP nets

Standards getting support from various parties

By John Dix
CW Staff

ATLANTA — Industry support of standard local-area networks used to implement the Manufacturing Automation Protocol (MAP) factory automation scheme, originated by General Motors Co., is coalescing at an unprecedented rate.

Ralph Ungermann, president of local network manufacturer Ungermann-Bass, Inc., and Joe Schoendorf, president of Industrial Networking, Inc. (INI), a joint venture of Ungermann-Bass and the General Electric Corp., outlined developments and directions in factory automation in an interview at the Interface '85 communications conference held here recently.

> *"Manufacturers have been installing islands of automation. Now these pieces must be woven together."*

To date, manufacturers have been installing islands of automation to address specific problems, Schoendorf said. Now these pieces have to be woven together. "Every company in the Fortune 500 has some automated [manufacturing] systems," Schoendorf estimated, "but less than 1% have tied these together in computer-integrated manufacturing systems. That's where all the action is."

Two new industry standards are responsible for the rapid buildup of factory automation technology and product development. The first is the IEEE 802.4 standard for token bus networks for use in factories; and the second that has gained industry support is GM's MAP specifications, a de facto standard that is modeled after the International Standards Organization's Open Systems Interconnect network reference model, Schoendorf said.

IBM, Digital Equipment Corp. and Hewlett-Packard Co., among other computer manufacturers, have endorsed the use of token bus networks in the factory, as have industrial control equipment manufacturers GE, Allen Bradley Co. and the Modicon division of Gould, Inc., Schoendorf said.

Other parties that have committed to the standards include the following:

■ Motorola, Inc. and Intel Corp., the largest board-level product suppliers to the industry. Schoendorf said both companies will announce products that adopt

See MAP page 67

■ Modemaplus has released a device that converts two-wire dial-up IBM SNA/SDLC to four-wire leased-line SNA/SDLC on IBM communications processors/66

■ Xpoint has announced printer and terminal controllers for the IBM System/34, System/36 and System/38 minicomputers/66

■ Forest Computer unveiled an IBM SNA gateway for non-IBM terminals and printers/67

INSIDE

Fibercom launches fiber-optic local-area net

ROANOKE, Va. — Fibercom, Inc. has released its Whispernet fiber-optic Ethernet local-area network which uses an active ring topology and which is reportedly competitively priced with coaxial technology.

Whispernet is said to support up to 1,024 nodes with the maximum spacing between any two being 4km. Nodes can communicate with each other within a 50-sq-km area (19-sq-mile) without gateways.

Whispernet consists of Fibercom's TFT-10 fiber-optic Ethernet transceivers, Whisperserv communications servers and low-speed fiber-optic user interfaces. The TFT-10 is used to connect each personal computer or other Ethernet-compatible device to the network while the Whisperserv provides interconnection for non-networked terminals and computers.

Interfaces for RS-232, RS-422, bisynchronous, asynchronous, X.25, V.35, Digital Equipment Corp.'s VAX and IBM mainframes are available. Whisperserv supports either the Xerox Corp. Network System protocol or the Department of Defense's Transmission Control Protocol and Internet Protocol. Reportedly, Whispernet can be used to interconnect existing coaxial cable Ethernets.

A typical network could support 32 terminals and microcomputers spaced 100 ft apart in a DEC VAX environment, using two transceivers ($760 each), a communications server ($15,600), 100 ft of fiber-optic cable (60 cents/ft), a VAX server ($13,000) and a unibus card for the VAX interface ($5,000), for a total of $35,160.

Fibercom is located at P.O. Box 7317, Roanoke, Va. 24019.

MCI seeks to double share in long-distance telecom mart

By Charles Babcock
CW New York Bureau

NEW YORK — The next two years offer a rare opportunity for companies in the newly deregulated telecommunications industry, and MCI Communications Corp. plans to capitalize on the times and increase its share of the long-distance market from 4.6% to 10%, according to William G. McGowan, chairman of MCI.

In remarks prepared for a recent meeting of the New York Society of Security Analysts, McGowan said the first year of AT&T divestiture proved to be more chaotic than telecommunications observers had foreseen. Not only was AT&T in disarray after the breakup, but many customers were on the defensive as well.

In Charleston, W. Va., one of the first equal-access battlegrounds where users were asked to choose their primary long-distance carrier, 60% of the 34,000 residents abstained from choosing, despite intensive advertising campaigns by MCI and other carriers. They became AT&T Communications customers by default. MCI plans to appeal to the Federal Communications Commission for a share of the default customers, McGowan said.

MCI gained about 10% of the nondefault long-distance customers in the Charleston contest but acknowledged that they were signed up at a price. Some MCI estimates put the cost per new customer at $2,000, compared to the $30 to $60 that MCI typically spends in a recruitment campaign.

After McGowan's remarks, Bert C. Roberts Jr., president of MCI Telecommunications, which handles the bulk of MCI's long-distance business, listed the following points on how MCI hopes to exploit its position as an AT&T Communications competitor:

■ As the divested Bell operating companies upgrade their central switching offices for equal access, the rotary phone market opens up to MCI. Rotary phones constitute over 50% of the market, but until equal access is put into effect, users of these phones cannot access MCI, Roberts said. All switching centers have to be converted by the end of 1986, he added.

■ An FCC provision has been implemented that requires automatic identification of the telephone number of the caller, which will reduce confusion over bills among MCI customers, Roberts said.

■ Of the 2 million customers who have been faced with choosing a primary long-distance carrier, MCI has gained about 200,000 — or 10% — of them, Roberts said.

■ MCI is just beginning to get the telephone numbers and names of those divested Bell operating company customers eligible for a competing service. The lists are supposed to be made available by the operating companies, and since the start of the year they have been "at a price approaching affordability," Roberts said. MCI wants to start getting the lists 120 days prior to conversion so it can target the customers for special mailings, he added.

■ In many cases, customers have signed up for MCI service, but the divested Bell operating companies have continued to route their calls over AT&T Communications lines. As many as 50% of MCI's signed-up customers continued to be routed over AT&T lines last fall, Roberts said. The number is lower today and he expects the confusion to be eliminated by mid-year, "but AT&T gets the traffic in the interim," he said.

FINALLY. HELP FOR THE DATA CRAZED.

Introducing Cypress,® Cedar,™ and Juniper.™ Three fast, friendly, infinitely applicable desktop ideas from ROLM.

It comes as no surprise that people react to technology differently. Dyed-in-the-chip techies thrive on it. True non-believers avoid it instinctively.

Now you can please all of the people all of the time. Honest.

Say goodbye to complicated log-on codes. Just push a button and—whoosh!—travel all the way to a data base, talk to a mini or access your IBM mainframe.

Say hello to speakerphones, phone books, message takers and calculators. Built right in.

If you want to take snapshots of data in your mainframe, there's Cypress. It's as easy as Point & Shoot. It's a smart little ASCII terminal integrated with a fully-featured digital phone.

Need a 512 KB, fully IBM-compatible PC that runs programs like pfs:graph,™ the IBM Assistant Series,™ 1-2-3,™ and lets you mini-network through your phone line? Cedar's the one.

Already in love with your IBM®PC or XT but crave the affections of Cypress? Ask for Juniper. Its one slot adaptor card lets your system keep growing. And growing.

Of course, only ROLM has Cypress, Cedar and Juniper. Because only ROLM has the system to run them on. At its heart is the CBX II, a breakthrough communications controller that manages voice and data over standard telephone wire. Simply, brilliantly and cost effectively.

And ROLM has the technical edge, the operational track record and the worldwide service and support organization to please even the toughest customer.

So phone ROLM. High tech. Not high anxiety.

ROLM

4900 Old Ironsides Drive, M/S 626 Santa Clara, CA 95050 • 800-538-8154. (In Alaska, California and Hawaii, call 408-986-3025.)

Trademarks: pfs:graph—Software Publishing Co., IBM Assistant Series—International Business Machines Corp., 1-2-3—Lotus Development Corp.

WARES from page 63

IBM 3180 display terminal and the IBM 3767 printing terminal. It continues supporting the IBM 3270-type terminals presently handled under SNA/SDLC.

The price of the package is $12,500, and it is available immediately.

Amdahl's announced support for RJE protocols through its 4460 network concentrator enables the unit to support combined asynchronous, bisynchronous and RJE data. The 4460 can now perform simultaneous packet assembly/disassembly (PAD) functions for networking terminals, RJE devices and host computers in mixed asynchronous, 3270 bisynchronous and RJE bisynchronous environments. The PAD allows pre-SNA terminals to emulate SNA features.

The enhanced unit is compatible with 3305 bisynchronous PAD X.25 communications software in the host, the company said. The 4460 is available in eight-, 16- and 24-port versions on the five-board unit. Prices are $15,000, $16,000 and $18,000, respectively. The 4460 network concentrators will be available in the third quarter of 1985.

Also announced was the 2211L time-division multiplexer that is compatible with Amdahl 2211 multiplexers and can be upgraded on-site to provide T1 trunking capabilities.

The 2211L supports Amdahl's voice I/O module, the vendor said. The price begins at $5,700. It will be available in the second quarter of 1985.

Multitrunking and hub management enhancements to Amdahl's line of time-division multiplexers will be available in the third quarter of 1985. Multitrunking will be a field-upgradable modification to the 2211 time-division units and will permit traffic reporting and reconfiguration of multiple T1 links from the central management system.

The hub manager will reportedly permit control of more than 50 T1 links from a central location and will enhance the operator interface and the diagnostic control set.

Multiple trunk enhancements will start at $2,000 and the hub manager will be available as transportable software with a monthly lease fee of $250.

Upgraded versions of Amdahl's Limited Distance Data Sets were also announced. Initial products in the family will support subrate and 56K bit/sec services and handle one synchronous channel and one asynchronous channel.

Subrate channels will support 2.4K, 4.8K and 9.6K bit/sec synchronous channels for primary use. Secondary channels will be selectable at speeds from 75 to 300 bit/sec. The 56K bit/sec units will support a main synchronous channel and an auxiliary channel rated up to 1.2K bit/sec.

The units will cost approximately $1,500, and they will be available in the third quarter of 1985.

More information is available from Amdahl, Communications Systems Division, 2500 Walnut Ave., Marina Del Rey, Calif. 90291.

PROTOCOL CONVERTERS

■ **Modemaplus, Inc. has released its Sna Sna protocol converter that converts two-wire dial-up IBM System Network Architecture/Synchronous Data Link Control (SNA/SDLC) to four-wire leased-line SNA/SDLC on IBM's 3705 and 3725 front-end processors.**

Sna Sna can provide 254 IBM physical unit Type 2 dial-up addresses from a single leased-line front-end processor port, according to a spokeswoman. Each physical unit Type 2 will support the correct number of logical unit addresses required.

Two-wire telephone dial-in access is allowed from any IBM 3274, 3276 or 3776 SNA/SDLC-type device at any modem speed up to 9.6K bit/sec. Sna Sna can also be placed at a remote node on a multidrop leased line, allowing local SNA/SDLC devices in that node to have dial-up access to a remote front-end.

Sna Sna can be used as an SNA/SDLC backup interface for a multidrop leased line.

A Sna Sna rack-mount configuration of 12 physical unit Type 2s costs $11,900.

Modemaplus, 217 E. Trinity Place, Decatur, Ga. 30030.

■ **Xpoint Corp. has announced printer and terminal controllers for the IBM**

System/34, System/36 and System/38 minicomputers.

According to a spokesman, the 5200-TX controllers allow low-end, asynchronous Ascii terminals, microcomputers and printers to access an IBM host through twinaxial cable.

The Ascii devices reportedly appear to the host as standard IBM workstations and printers.

A 5200-TX Printer Controller allows an asynchronous Ascii printer to emulate IBM 5256, 5224 or 5225 printers.

The 5200-TX Terminal Controller reportedly allows asynchronous Ascii terminals or microcomputers to appear to the IBM host as IBM 5251 Model 11 workstations, and the controller is compatible with IBM 5251, 5294 and 5295 controllers.

Each 5200-TX Controller is priced at $1,545.

Xpoint, Suite 130, 5600 Oakbrook Pkwy., Norcross, Ga.

VOICE/DATA COMMUNICATIONS

■ Forest Computer, Inc. has announced an IBM systems network architecture (SNA) gateway for non-IBM terminals and printers.

The 1KS/SNA system is said to allow more than 1,000 terminals of any type to communicate with both IBM and non-IBM hosts in native mode. The hardware consists of a Hewlett-Packard Co. HP 1000 A-Series minicomputer and programmable serial interface (PSI) cards. The software in the A-Series handles SNA control, frame processing and data stream conversion, the company reported. The PSI cards are programmed to handle a variety of protocols. Forest 1KS/SNA software costs $35,000, and the hardware begins at $35,000.

Forest Computer, 1749 Hamilton Road, Okemos, Mich. 48864.

MAP from page 63

these standards this summer.

■ Robot manufacturers Cincinnati Milacron, Inc. and GMF Robotics (GMF), a joint venture between GM and Fanuc Ltd. of Japan.

■ Computer-aided design equipment suppliers Apollo Computer, Inc., Calma Corp. and others.

According to Schoendorf, major user companies such as Ford Motor Co., McDonnell Douglas Automation Co. and DuPont De Nemours & Co. have sent letters to vendors informing them of their endorsement of MAP and indicating that future equipment purchases will be swayed by that fact.

Today, the automated systems these companies use operate autonomously or with machines and systems doing similar tasks. "Programmable controllers talk to other programmable controllers," Schoendorf said. "The same with robots. Typically you had one type which could do the same thing, like welding."

Process becomes complicated

When you try to integrate systems performing different tasks and enter variations into the automation process — for instance requiring robots to paint cars different colors — the process becomes complicated.

Integration gets even more difficult when it becomes desirable to tie together systems used in the various stages of manufacturing given the different computer systems used and the management structure, Schoendorf said.

Schoendorf's Santa Clara, Calif.-based company was formed last October to push local network-based systems that can be used to integrate these systems. The firm was formed as a joint venture between Ungermann-Bass, which provides its networking knowledge, and GE, which put up $6 million in funding.

INI will build board-level products that can be directly integrated into the backplane of IBM Personal Computers, DEC Q-bus processors, Intel's Multibus-based systems and products built on Motorola's VME bus, Schoendorf said. It will also build boards for a standard serial bus as used in products from companies like GMF and HP.

TeleVideo corrects the VT220 key mistakes.

The new TeleVideo® 922 shares but one feature with the VT220®: DEC®-compatibility. The similarity ends there.

TeleVideo 922

DEC VT220

1. Take our keyboard, for example. The RETURN key is within direct, easy reach. But VT220 users must stretch over an additional key to hit RETURN. Or have the hands of a concert pianist.

Here's ours.

Where's the VT220 ESCAPE key?

2. Our ESCAPE key is located above the TAB key, right where you'd expect to find it.

Theirs isn't.

In fact, you have to go hunt for the VT220 ESCAPE key halfway across the row of function keys.

3. Take a look below at the 922 keyboard. That's a true accounting keypad, complete with a Clear Entry, Double Zero and a TAB key. Not merely the numeric keys you get with the VT220.

4. Our SHIFT key is exactly where it should be, so it does exactly what it should do—shift. Their SHIFT key is shoved over by the < and > key to create lots of < and > on the CRT. Of course with a little practice, you could relearn their keyboard. But why, now that you've seen our 922?

922 Display Screen.

VT220 Display Screen.

5. And after we built a better keyboard, we built a better terminal. With exceptional reliability. Quality. Advanced ergonomics. Everything you'd expect from the industry ANSI leader.

The new 922 is available now and priced to move now. And it's backed by a worldwide sales and support network.

6. Here are 5 more advantages to the 922.

	TeleVideo 922	DEC VT220
Programmable Function Keys	15 (30 with shift)	15 (shifted only)
True Accountant Keypad	YES	NO
Plug-in Graphics Upgrade Option	YES	NO
Full Tilt & Swivel	YES	NO
Enhanced ANSI Mode	YES	NO

DEC VT220 are registered trademarks of Digital Equipment Corporation.

800-538-8725.
In California, call 408-745-7760.

The TeleVideo® 922

SYSTEMS & PERIPHERALS

Cash registers to mainframes

The legend of NCR

By John Desmond
CW Staff

Second in a nine-part series

NCR Corp.'s current television commercials emphasize its 30-year involvement in the computer business. Sometimes rocky and disappointing, those years represent about a third of the company's 101-year history.

NCR's dominance in the cash register business is legend — a fact that appears to have had both a positive and negative impact on the company's ability to compete in the mainframe computer business. At the turn of the century, NCR gained a reputation for making highly durable and popular mechanical cash registers. Improvements to that cash register line drew the company into developing electromagnetic business machines.

By the 1930s, NCR was doing electronics research for the U.S. Navy. That research led to development of NCR's line of electromechanical accounting machines that it marketed until the 1950s. These included the NCR Post-Tronic electronic bank accounting machine, which featured a magnetic reading and recording stripe on ledger cards. "But none of the units in the 1940s had anything to do with von Neumann stored logic or Boolean algebra functions. It was all pulse electronics," recalled Carl Rench, a now-retired vice-president of research for NCR.

NCR decided to enter the mainframe computer business in the early 1960s, shortly after Remington Rand, Inc. delivered the Univac I processor to the U.S. Bureau of the Census. "It became obvious to us that computer products were going to give NCR some problems," Rench recalled. NCR threw its hat into the mainframe processor ring with Remington Rand and IBM, the latter company founded by Thomas J. Watson Sr., who was fired by NCR back in 1913.

Although some industry watchers in the early 1960s predicted a limited future for commercial computer systems, Stanly Allyn, president of NCR in 1963, decided to commit the cash register giant to the burgeoning computer business by acquiring Computer Research Corp. (CRC) of Hawthorne, Calif., which was renamed NCR Electronics Division.

CRC had already developed the CRC 102, a data processing system aimed primarily at scientific and military markets, which featured logic geared toward rapid processing. Because the 102 used germanium diodes in place of some some vacuum tubes, it required less power and was cheaper than much of its competition at the time. By 1955, NCR had installed 30 of the CRC 102s, but "it became obvious it wasn't going to crunch information fast enough." If NCR was to penetrate the business market with computers, it needed a product with more efficient I/O. To

See NCR page 73

Wang DP growth seen lacking

User lauds progress but calls products deficient

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — A seasoned user of Wang Laboratories, Inc.'s systems recently commended the vendor for its progress in broadening its product focus to encompass DP as well as word processing.

But in the same breath, independent systems consultant George Gowen tempered his praise with a pointed reminder that, in several important respects, Wang's DP-oriented technology remains markedly deficient.

Speaking at the recent Wang Enterprise West users group meeting, Gowen credited the Lowell, Mass.-based company with substantially improving the ability of its VS processor line to address the needs of the commercial DP marketplace. In particular, during the past three years, Wang has boosted the VS family's processing power, upgraded its customer services and begun adopting firm schedules for correcting operating system bugs, Gowen said.

Although Wang "has come a long way in the DP world, it still has a long way to go," he said. Even today, the firm's VS processors still lack a data base management system comparable to IBM's IMS, and they suffer from operating systems incompatibility with the word processing side of Wang's product line.

Gowen said he based his observations on his personal experience as an independent systems consultant contracted by the locally headquartered Bank of America National Trust and Savings Association. Roughly three years ago, he was hired by the bank to oversee the development of a pension fund administration system.

After evaluating and rejecting various alternatives, Gowen selected Wang as the vendor to supply the system's hardware. He had concluded during his lengthy product evaluations that Wang offered the best combination of price, processing horsepower, growth path and functional flexibility for the application in question. His conclusions soon led him to acquire a

See WANG page 76

■ Teradata said it has successfully tested a 60-processor version of its DBC/1012 data base machine for IBM mainframe environments/76

INSIDE

Memorex dot matrix printer out

SANTA CLARA, Calif. — Memorex Corp. has announced a multifunction dot matrix screen printer that can be attached to the firm's monochrome display stations. The Memorex 2173 screen printer is compatible with applications software supported by IBM 3270 terminals or the IBM System/34, 36 or 38.

The 120 char./sec printer is said to allow Memorex 2051, 2078 Model 82, 2078 Model 2 and 2178 display station users to print screen displays with one keystroke. Typical applications include program listings, financial reports and credit listings, the vendor said.

The printer stores information in a buffer so that the user reportedly can continue using the display station without having to wait for the printer to finish. It operates without intervention of the central processor and does not require additional support programming, according to the vendor.

Standard features include a bidirectional, logic-seeking print head; a cassette-type ribbon; a tear bar; and self-diagnostics. Users can select from 10, 12 or 17 char./in. in standard resolution mode or 10 char./in. or proportional spacing in high-resolution mode.

The Memorex 2173 costs $995 for single quantities, with volume discounts available.

Memorex is located at San Tomas at Central Expwy., Santa Clara, Calif. 95052.

VDT users prefer IBM; rate function over price

By Donna Raimondi
CW Staff

NEW YORK — VDT buyers want increased functionality and feature selection, and the price of what they buy is important, a recent Datapro Research Corp. survey said.

IBM has captured the lion's share — 36% — of the VDT market, according to Datapro's "1985 User Ratings of Display Terminals." Users who buy IBM terminal equipment indicated that features and functions and vendor recognition are more important than price, the survey noted. Digital Equipment Corp.'s 9% share was listed as the next largest portion of the market.

Users rated the overall performance of IBM's VDTs lower than terminals from AT&T or Hewlett-Packard Co., each of which holds 5% of the market to tie for third place, according to the survey. AT&T and HP each received a 3.6 out of a possible 4.0 score for overall performance of all their VDT models. DEC and IBM followed with scores of 3.5, followed by Burroughs Corp., Sperry Corp. and Televideo Systems, Inc., with 3.3 each. ITT Courier Terminal Systems, Inc., Memorex Corp. and Telex Computer Products, Inc. followed with 3.2 each, the survey showed.

CIE Terminals, Inc. rated the highest in ease of use, with a 3.8. Other vendor ratings were as follows: AT&T Teletype and DEC, 3.5; IBM, 3.4; Burroughs, 3.2; and Applied Digital Data Systems, Inc., 3.1. The average for all users was 3.3.

The nearly 900 user responses to the survey included 1,910 individual responses on VDTs, 720 responses covering cluster controllers and 63 responses on voice/data workstations. Several respondents rated personal computers under the VDT category, which, Datapro said, indicates a growing trend toward the replacement of display terminals with micros. Models were rated for overall performance, ease of operation, display clarity, keyboard feel and usability, ergonomic features, hardware reliability and manufacturer's maintenance, Datapro said.

The study — coupled with Datapro's report titled "All About Alphanumeric Display Terminals" — costs $25. It is also included as a supplement to Datapro Reports on Data Communications, an information service that costs $750. More information can be obtained from Datapro Research, 1805 Underwood Blvd., Delran, N. J. 08075.

Teradata builds 60-CPU version of DBC/1012

LOS ANGELES — Teradata Corp. said it has developed a 60-processor version of its DBC/1012 parallel processor data base machine that offers processing power equivalent to 24 million instructions per second and storage capacity of 19G bytes.

The configuration was developed as an internal project within Teradata. While the vendor theorized that the maximum number of parallel processors that can be configured in the DBC/1012 is 1,024, the largest unit the company has installed to date is a 20-processor configuration. The 60-processor configuration costs $1,700,000, and the vendor claims the unit offers performance roughly equal to IBM's 3084 Model Q mainframe. Although the vendor said the configuration is available to end users, Teradata has not accepted orders for the 60-processor unit.

The DBC/1012 is a specialized parallel processing system designed to manipulate data base requests in IBM mainframe environments. In the Teradata experiment, an IBM 4341 Model 2 and an Amdahl Corp. 5840 running IBM's MVS operating system were used.

Teradata is located at 12945 Jefferson Blvd., Los Angeles, Calif. 90066.

TERMINALS

■ **Gixi, Inc. has announced an enhancement to its Radiance 2000 terminal, support for an ink-jet printer and its GKS-Gral graphics standard package.**

The Radiance 2000 terminal now offers eight simultaneous colors from a palette of 16 on its 20-in. screen. Single-unit price for the R2000 is $18,000.

The company announced support for an ink-jet printer that will provide eight to 12 dot/mm using the selected formats of ¼A4, A4 or A3 (maximum size 400mm by 280mm). This printer uses up to 4,096 colors to capture the images of the R2000 and is switchable in dot/mm, format size and resolution, the vendor said. The printer price is approximately $35,000.

Gixi has also introduced GKS-Gral, its version of a graphics standard package developed by Gral in West Germany. It is currently available in every level of a graphics kernel system and has been ported to most major operating systems.

Source or binary licenses are available. Prices range from $1,000 for a microcomputer binary license to $35,000 for a mainframe source license.

Gixi, 7808 Glenroy Road, Minneapolis, Minn. 55435.

■ **Kei, Inc. has announced product enhancements and price reductions for its J1000 series monochrome and color graphics display terminals.**

Enhancements include color commands for Digital Equipment Corp. VT100 operation; ML and MT Tektronix, Inc. 4105 color commands; a mouse option for control of crosshair location; an interface for the Diablo Systems, Inc. C150 color ink-jet printer; and rectangle fill, erase and reverse video capability. A dual-plane option for the J1014 that can be used in the terminal's Tektronix emulation mode is also available.

Reductions in price on the terminals, effective immediately, range from 10% to 20%. Current prices for the J1000 series terminals are $2,595 and $4,950 for the J1014 14-in. monochrome and color terminals, respectively, and $3,950 and $6,750 for the J1019 19-in. monochrome and color terminals, respectively.

Kei, 400 W. Cummings Park, Woburn, Mass. 01801.

■ **I-O Marketing has released its I-O 1181 Executive Terminal, which attaches directly to IBM System/34, 36 and 38 systems and supports printers with standard RS-232C asynchronous Ascii serial interface.**

The I-O 1181 features a 13-sq-in. footprint and includes a choice of amber or green screen, detachable keyboard, keyboard selectable terminal and printer setup. The unit can make the printer system addressable. With I-O's Command Pass-Thru communications device, printer control codes reportedly may be passed directly to the printer.

The I-O Executive Terminal costs $1,995 for the system-addressable model and $1,595 for the screen dump model.

I-O Marketing, 3497 W. 2100 South, Salt Lake City, Utah 84119.

■ **Qume Corp. has announced its QVT-101 editing terminal with bi-directional printer port, RS-232 interface, a nonglare green screen, foreign character sets and an adjustable-height keyboard.**

The QVT-101 terminal features block-mode data transmission. Interface options allow the terminal to operate remotely from a micro, mini or mainframe host computer. It offers 16 host or user-programmable functions. Options include current loop or RS-422 interfaces.

The QVT-101 terminal costs $395.

Qume, 2350 Qume Drive, San Jose, Calif. 95131.

PRINTERS/PLOTTERS

■ **Wespercorp has announced the DLP-3800 printer controller in its Datasystems line for IBM System/34, 36 and 38 minicomputers, emulating IBM's Model 5219 daisywheel printer, Model 5224, 5225 and 5256 matrix printers, Model 5211 band printers and Model 5203 train printers.**

The DLP-3800 has two rear-mounted twin-axial connectors and plugs directly into the CPUs. The

Continued on page 72

Why people choose an IBM PC in the first place is why people want IBM service...in the first place.

After all, who knows your IBM Personal Computer better than we do?

That's why we offer an IBM maintenance agreement for every member of the Personal Computer family. It's just another example of blue chip service from IBM.

An IBM maintenance agreement for your PC components comes with the choice of service plan that's best for your—at the price that's best for you.

Many customers enjoy the convenience and low cost of our carry-in service. That's where we exchange a PC display, for example, at any [illegible] Centers.

And for those customers who prefer it, we offer IBM on-site service, where a service representative comes when you call.

No matter which you choose for your PC, an IBM maintenance agreement offers you fast, effective service.

Quality. Speed. Commitment. That's why an IBM maintenance agreement means blue chip service. To find out more about the specific service offerings available for your PC, call 1 800 IBM-2468, Ext. 90 and ask for PC Maintenance.

Blue chip service from IBM.

SYSTEMS & PERIPHERALS

Continued from page 70

controller also supports Centronics Data Computer Corp., Dataproducts Corp. and RS-232 interface printers.

The DLP-3800 is housed in a self-contained 11-in. by 13-in. by 4-in. enclosure weighing 12 lbs.

The price for DLP-380-0 is $1,595.

Wespercorp, 14511 New Myford Road, Tustin, Calif. 92680.

■ Facit, Inc. has introduced two-pen plotter systems that contain RS-232C serial and Centronics Data Computer Corp. parallel interfaces.

The 4550 and 4551 plotters were designed specifically for the low-end business graphics, computer-aided design and computer-aided engineering markets, the vendor said. The plotters reportedly meet the requirements of the Hewlett-Packard Co. Graphic Language (HP-GL).

The 4550 accepts media sizes up to 8½ by 11 in., and the 4551 accepts up to 11 by 17 in. Both plotters feature removable six-pen cassettes.

The 4550 plotter costs $795 each, and the 4551 costs $995 each.

Facit, 9 Executive Drive, Merrimack, N.H. 03054.

POWER SUPPLIES

■ K/W Control Systems, Inc. has announced that it will distribute Piller of West Germany Unibloc Series II Modular uninterruptable power supply (UPS) for IBM 4300-size CPUs and communications installations.

The UPS is available in power ratings of 40, 60, 80 and 120 kVA. It is said to ensure a 60Hz output and isolation of the critical load from the utility. The basic module — installed without the inverter and battery — protects against power-line transients such as voltage spikes and undervoltage dips, long-term brownouts, loss of phase and power interruptions of up to 100 msec.

For the stabilizer module only, prices start at $26,000. Prices for the UPS protection modules add $19,000 and up to the stabilizer price.

K/W Control Systems, S. Plank Road, Middletown, N.Y. 10940.

AUXILIARY EQUIPMENT

■ Tymshare, Inc.'s Computer Systems and Support division has announced the 4060P and 4060D universal disk head testers, said to help reduce downtime from incorrect diagnosis.

The 4060P is portable, and the 4060D is stationary. Both are intended for use in testing and certifying 100M-byte, 200M-byte and 300M-byte removable read/write disk heads for OEMs, including Century Data Systems, Inc., Control Data Corp., California Computer Products, Inc. and Memorex Corp.

Test data includes readings at highest and lowest write frequencies, resolution percentage and overwrite in decibels.

The price for the testers is said to start at $19,500, including a CRT, printer and eight hours of training.

Tymshare, 20705 Valley Green Drive, Cupertino, Calif. 95014.

■ The John Fluke Manufacturing Co., Inc. has introduced two new interface pods to support Intel Corp.'s 16-bit 80186 and 80188 microprocessors that are used in personal computer and smart terminal applications.

The pods are used as an interface between a Fluke 9000 Series Troubleshooter and a unit under test for servicing purposes or can be used in designing products that have microprocessors in them, the vendor said. The pods interface between a board that is being tested and the 9000 Series testing instrument. The pod acts as a microprocessor and the testing instrument checks it to identify problem locations.

The 80186 and 80188 pods are priced at $2,695 each. The 9000 Series Troubleshooter ranges from $3,595 to $4,595.

John Fluke Manufacturing, P.O. Box C9090, Everett, Wash. 98206.

■ J & W Instruments, Inc. has announced a programmable data logger with a CRT display and printout recording. The Digi/Scan 10C monitors manufacturing processes and has an RS-232C port that allows it to be hooked up to a user's system.

The Digi/Scan 10C comes with per channel scaling, dual alarms and alarm messages.

Single-channel display shows process value, engineering units, alarm values, alarm messages, print intervals plus channel number, time and date.

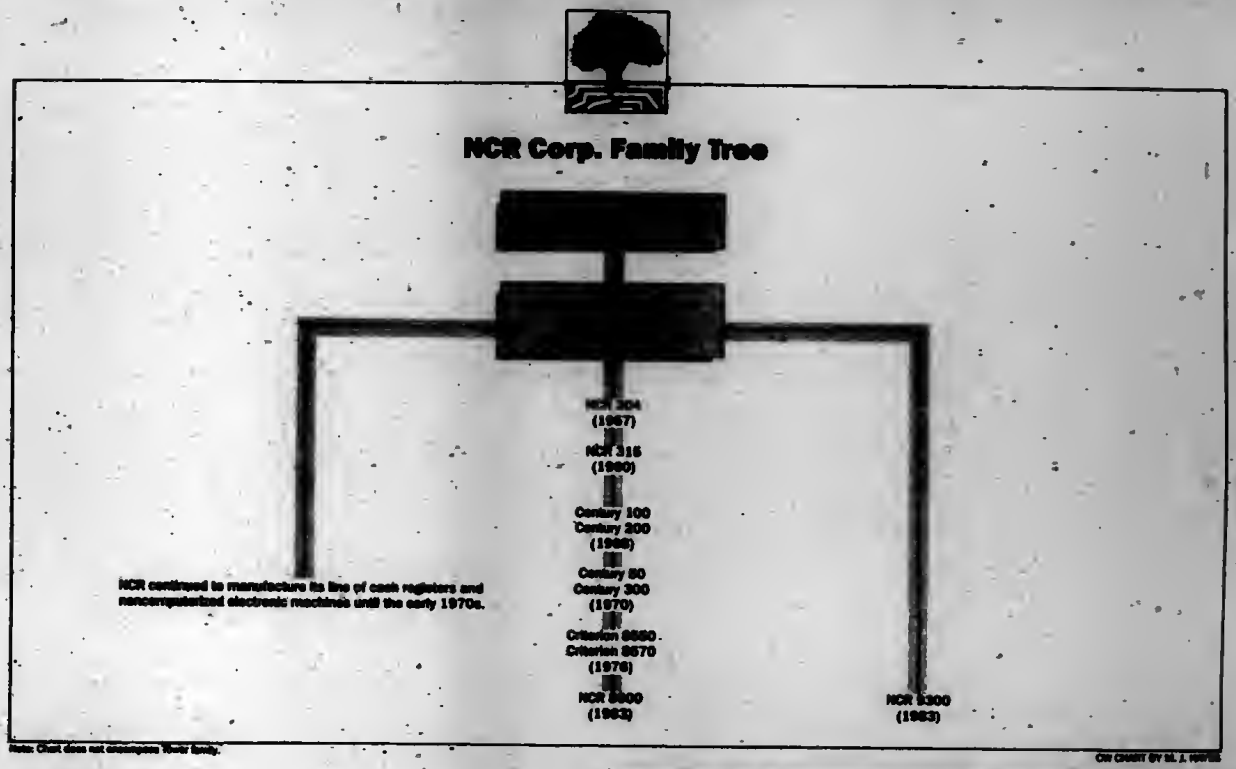
The Digi/Scan 10C costs approximately $5,200 for a 16-channel unit and is expandable in 16-channel increments up to 128 channels.

J & W Instruments, 4800 Mustang Circle, New Brighton, Minn. 55112.

■ Triconex Corp. has announced the Tricon 1 control system featuring a distributed modular processing architecture with triple redundancy for continuous system availability in factory automation and process control applications.

A spokesman said a single system can perform both sequential and analog control to handle mixed application inputs. Tricon 1 is intended to withstand shock, vibration, noise, electrical emissions and other conditions in harsh operating environments. It features a scan rate of 6 msec to 20 msec for monitoring up to 512 digital points, 256 analog points or 128 loops. An expansion chassis accommodates field terminals

Continued on page 74



Note: Chart does not encompass Visor family.

CW CHART BY M. J. HAYES

NCR from page 69

develop such a product, NCR entered a joint venture with Westinghouse Electric Corp. under which Westinghouse would develop the needed processor and NCR the peripherals. The resulting product was the NCR 304, which NCR claimed was the world's first fully transistorized computer.

The 304 was announced in 1957 and first installed in 1959 for the U.S. Marine Corps at Camp Pendleton, Calif.

The Marines used the system to maintain personnel and equipment records. "The 304 had a hell of an I/O capability," Rench said. The 304's high-speed paper tape input could change thousands of numbers each second.

But the 304 was expensive to produce and may have emphasized I/O efficiency at the expense of processing speed. The company sold only about 30 304s, Rench said. In efforts to improve the 304, the Electronics Division went to work again, and in 1960, the NCR 315 was announced.

'Solved I/O constipation problem'

"It solved the constipation [I/O] problem in a properly balanced fashion," Rench said. The 315 processed information in 12-bit slices, which NCR called "slabs." For a bank, the 315 could post 1,500 checking accounts per minute.

The NCR 315 remained the staple of the firm's system lineup for the next eight years, until NCR unveiled its first product to use integrated circuits, the Century line. Developed by the Electronics Division, the Century — which NCR internally called the model 615 — used metal-oxide semiconductor circuits and featured a short-rod memory instead of core memory.

The Century software was written in NCR's Neat language, which had been used in the preceding processors.

Although NCR's mainframe strategy was beginning to take form, its staid mechanical cash register business started to fall apart. The company ranked 89th in revenue but 334th in profits in the 1966 Fortune 500 listing. "It became obvious that integrated circuits of various types were going to zap . . . mechanical cash registers and accounting machines," Rench said.

But in spite of slumping sales, NCR believed it could still make money from electromechanical accounting machines and cash registers, and it continued to produce them. The decision proved costly. By the early 1970s, NCR was forced to write off more than $70 million in mechanical cash registers and electromechanical accounting machines that it could not sell. A new company president, William Anderson, announced in 1972 that all electromechanical products were being phased out.

In the midst of dramatic losses from older technology business machines, Rench took charge of R&D in 1970. One of his first decisions was to concentrate on moving NCR mainframe users from the Neat language to the more popular Cobol. "That was one thing I hit hard on: to make Cobol the international standard and to hell with Neat," Rench recalled.

Just as sales of the Century were starting to take off, NCR hit another stumbling block. Early Century installations had memory reliability and disk performance problems. The Electronics Division had developed an innovative memory disk that featured a cobalt rather than iron-oxide plating.

But the cobalt plating tended to become gouged whenever there was a head crash. This resulted in the destruction of data, Rench said. The company had to retrofit many disk drives with a different head as a result, and the cost to do so was high.

As news of the technical problems with the Century spread, orders for the system slumped. Even when the technical problems were overcome, the Century would never be the same. Rench said sales of the system only reached half of the company's original projections.

Computer business operating in black

Despite Century's problems, NCR's computer business moved into the black in 1974 for the first time since the company entered the computer business. In 1976, NCR announced the Criterion Series, featuring a bus backboard, advanced circuitry of NCR's own design and software portability from the Century.

NCR photo

CRC 102-A general-purpose computers in production final test, early 1960s.

Then, company President Charles Exley Jr., formerly of Burroughs Corp., emphasized in marketing literature the various Criterion model sizes available. The Criterion sold well and met projections, Rench said.

NCR has since announced the 8600 and 32-bit very large-scale integration 9300 to maintain its presence in the large-processor marketplace. A comparison of the NCR 304 and 9300 illustrates how dramatically computer hardware has decreased in size and increased in power over 20 years.

The 304 weighed 3,450 lb; the 9300, 50 lb. The 304 took up 35 sq ft of floor space; the 9300, 4 sq ft. The 304 had the equivalent of 600,000 transistors, all hand-wired; the 9300, 40 million transistors, in a mostly automated production. Finally, in 1963 dollars, the 304 was priced at $1,125,000, and the 9300 costs $23,000.

SYSTEMS & PERIPHERALS

Continued from page 72

located up to 4,000 feet fromthe main system.

Each main processor is a National Advanced Systems, Inc. 32C016 Cmos 16-bit microprocessor with a 32-bit architecture. Each I/O processor is an Intel Corp. 8031 8-bit microprocessor. Each main CPU has 128K bytes of main memory, expandable to 512K bytes, and each has three Ascii ports for connecting printers, disk drives or terminals.

The system operates by exception. Signals are examined at each input processor to determine whether a change of state has occurred, the vendor said.

Beta site installations of Tricon 1 are scheduled to undergo field testing soon. The system is scheduled to be in volume production by the third quarter of 1985, the firm said.

The base price for Tricon 1 is $12,000; a typical fully configured system costs $72,000.

Triconex, 17752 Mitchell St., Irvine, Calif. 92714.

■ **Preston Scientific, Inc. has announced a digital I/O option for the GM series data conversion systems, said to enable users to input or output digital data over the same interface used to control the analog to digital converter (ADC). The product can also be used with a digital to analog converter subsystem.**

Called Digital I/O Sub System, the product is for use on equipment from Digital Equipment Corp., Hewlett-Packard Co. and Data General Corp. Digital I/O subsystems provide transistor-transistor logic, discrete input lines grouped in 16-bit words as well as the ability to input digital data and intermix the digital data channels with ADC output data and output digital words to the user.

To address digital channels, the GM systems include a channel address memory, said to allow digital input or output data to be inserted randomly in the data stream during any point in the measurement cycle.

The price for Digital I/O Sub System is $850 plus $200 per channel for 16-bit digital inputs and $360 per channel for 16-bit digital outputs, the company said.

Preston Scientific, 805 E. Cerritos Ave., Anaheim, Calif. 92805.

■ **Panafax Corp. has introduced the UF-400 digital facsimile machine, which measures 13- by 14-in. and weighs less than 37 lb, according to a spokesman for the company.**

Features include line density of up to 391 line/in. and scanning of documents up to 11-in. wide. The unit prints on thermal paper. The UF-400's control panel includes eight displays, including an LCD digital display, resolution and contrast levels and header print information.

Any errors are displayed with a diagnostic code. Up to 30 documents can be accommodated in the machine's automatic document feeder.

The price for the UF-400 is $2,995, the vendor said.

Panafax, 10 Melville Park Road, Melville, N.Y. 11747.

■ **MDB Systems, Inc. has announced an enhanced storage module drive (SMD) controller with data transfer rates of up to 2.5M byte/sec.**

According to the vendor, the MLSI-DK11 is a 20-MHz quad-size controller for Digital Equipment Corp. Q-bus systems. It reportedly will operate disk drives with SMD interfaces that can operate at 1.2M byte/sec or the 1.8M and 2.4M byte/sec rates of the Fujitsu America, Inc. Eagle and Eagle XP.

The controller features a 22-bit direct memory access (DMA) data transfer addressing range for computer memory and block-mode DMA data transfer capability, according to the vendor.

It reportedly is transparent to most DEC operating system software with RM03, RM05, RM80 or RP06 emulation.

Scheduled for delivery in the first quarter of this year, the MLSI-DK11 is priced at $2,330.

MDB Systems, 1995 N. Batavia St., Orange, Calif. 92667.

■ **Emulex Corp. has announced Decathlon, a packaged subsystem utilizing the small computer system interface (SCSI) bus structure.**

Decathlon also supports the IBM Personal Computer XT and compatible CPU bus structures using the vendor's SCSI host adapter. Connection to other CPUs can be made through a manufacturer-supplied host adapter, the vendor said.

According to the vendor, Decathlon comprises a basic chassis with power supply, the appropriate SCSI-compatible disk or tape controller, the user's choice of up to three 5¼-in. form-factor peripherals in either a single rack-mount cabinet or tower enclosure.

Pricing for the vendor's ER3/110-110-T package consisting of two 110M-byte formatted 5¼-in. disk drives with the ¼-in. cartridge tape drive is $15,425. Other prices vary depending on the equipment needed.

Emulex, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

"It gives us the answer. But it says it doesn't want to be quoted."

Test Your Microcomputer IQ*

1. Name a totally integrated software package that was rated #1 by *Software Digest*. ____
2. Where can you buy an IBM PC XT or AT, AND have it installed, AND get on-site warranty for it? ____
3. Who will educate IC personnel or end-users at their site or yours? ____
4. What provides virtually any type of PC communications capability — from simple TTY to 3278/79 emulation? ____
5. What provides a micro software facility that allows you to customize a system to your specific requirements? ____
6. Who are the premier micro consultants to the *Fortune* 1350 companies? ____
7. Who has made the word hot-line obsolete, by staffing a full-service support center with computer professionals? ____
8. What is the easiest way for an IC manager to satisfy the many end-user needs in the organization? ____
9. What company's evolutionary approach to software and service (also demonstrated by NOMAD, now NOMAD2, the premier 4GL/DBMS) ensures that they'll be a major force in the micro marketplace for years to come? ____
10. Name the companies that can provide all of the above? ____

*(Turn Page Upside Down for Answers)

1.DunsPlus Software 2.From DunsPlus 3.The DunsPlus Education Staff 4.DunsPlus's Communications Utilities 5.The DunsPlus Tool Kit 6.DunsPlus's Professional Consulting Staff 7.The DunsPlus Support Center 8.Call DunsPlus at 800-DNB-PLUS 9.Dun & Bradstreet, the parent company of DunsPlus 10.DunsPlus

If you answered all of the above correctly, you've already solved most of the problems facing you. If not, give us a call at 800-DNB-PLUS, or write us at 187 Danbury Road, Wilton, Connecticut 06897.

DunsPlus:
An Innovation In End-User Computing From Dun & Bradstreet

DunsPlus

a company of The Dun & Bradstreet Corporation

WANG from page 69

Wang system built around dual 2M-byte VS 100s and six 300M-byte disk modules.

At the time, Wang focused much more heavily on word processing than on DP, and the bias was clearly reflected in the VS product family's many shortcomings, Gowen recalled.

Although the bank's VS 100-based configuration worked well overall, he said, its disk switches failed frequently and, in so doing, "brought down the whole system." Other technological drawbacks with the Wang product included the absence of a standard communications protocol, high-speed printer and forms downloading capability.

Wang's defects also reportedly extended to the VS line's customer service and support. When the bank's system encountered a serious problem, support specialists back in the vendor's headquarters office were unable to simulate the customer's configuration and duplicate the breakdown, Gowen said.

To make matters worse, Wang's field support force proved to be woefully ignorant about many facets of DP technology, according to Gowen. Although the support staff members were attentive and diligent, they had clearly been "left out on a limb," he said. "They had come from a word processing background and weren't used to talking to the data processing world."

Since then, Gowen and the bank have reportedly doubled the VS 100 configuration's main memory to 4M bytes, replaced its original disk units with dual 640M-byte modules and added a high-speed communications pipeline between the system's two CPUs.

By chance, the growth in the bank's system coincided roughly with a steady expansion in Wang's product focus, Gowen said. Even though it has continued its traditional emphasis on word processing, the company has gradually intensified its technological assault on DP.

As evidence of his theory, Gowen cited Wang's recent introduction of the VS 300, which reportedly boosts the VS family's raw horsepower by adding a floating binary point. Because the announcement tacitly acknowledged users demand for increased throughput, the independent consultant hailed the VS 300 as a milestone in Wang's evolution as a DP-oriented vendor.

Another purported sign of Wang's expanded commitment to the DP workplace is the firm's emerging tendency to equip its systems with remote diagnostics. "[Wang isn't] just throwing some sand on the table and dancing around anymore," Gowen said. "They're developing the ability to service their systems in real time."

Gowen also sees DP-oriented progress in Wang's growing ability to identify operating systems defects and in its increased willingness to release firm timetables for correcting those problems. In the past, he recalled, customers were often left to guess about when the latest release of the company's VS control program would be debugged.

But for all its recent advances on the DP front, Wang has yet to address its VS users' needs for a high-speed printer or industry-standard communications protocol adequately, Gowen said.

Nor, apparently, has the company done all it should to upgrade its VS customer support. "All their telecommunications courses are still conducted on the East Coast — which isn't a lot of help for those of us in California," Gowen said.

"Are these things supposed to have commercials?"

SPECIAL REPORT

Micros in Big Business

In the April 29th Computerworld Special Report we'll report on management strategies for integrating micros into corporate information systems; offer users' experiences with micros; discuss the emergence of the Personal Computing Manager; provide overviews of business-related microcomputer hardware, applications software, and systems software; look into security risks; and examine how large MIS/DP organizations are networking their micros.

If you market business-related micro products, tell Computerworld's 600,000 readers in the April 29th issue. Our readers are heavily involved in the purchase of business-related micros, services, and supplies. For example, our subscribers at end-user organizations are personally involved in purchase decisions for the following products:

Product	Percent involved in purchase decisions
Microcomputers	84%
Local area networks	75%
Micro-peripherals	74%
Portable personal computers	75%
Floppy disks and diskettes	83%

Our subscribers at vendor organizations are equally influential — especially when you consider that they often buy in quantity:

Product	Percent involved in purchase decisions
Microcomputers	57%
Micro-peripherals	52%
Portable personal computers	34%
Floppy disks and diskettes	43%

Reserve space for your ads now. Simply fill out the coupon below and return it today. Or, if you prefer, call Ed Marecki (the National Sales Director) at 617-879-0700. Call today.

Advertising close: April 12

☐ Yes, I want to reach active buyers of business-related micro products. Please send me advertising information on the April 29th Special Report issue — Micros in Big Business.
☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____

Return to: Ed Marecki, National Sales Director
Computerworld, 375 Cochituate Road, Framingham MA 01701

COMPUTERWORLD

A PUBLICATION OF CW COMMUNICATIONS

COMPUTERWORLD

Boston: (617) 879-0700/Chicago: (312) 827-4433/New York: (201) 967-1350/Atlanta: (404) 394-0758/Houston: (713) 952-1220/San Francisco: (415) 421-7330/Los Angeles: (714) 261-1230

If you're reading someone else's Computerworld, cut it out.

☐ **Yes!** Please send me *Computerworld* for one year at $39 (that's $5 off the annual subscription rate of $44) plus all 10 COMPUTERWORLD FOCUS issues at no extra charge. I understand that my satisfaction is guaranteed and that I may cancel at any time and request a refund on the unused portion of my subscription.

First Initial Middle Initial Last Name

Your Title

Company Name

Address

City State Zip Code

☐ Bill me.
☐ Payment enclosed.
☐ Charge to my credit card.
☐ AmEx ☐ VISA ☐ MC

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

(MC Only-List four digits above your name.) ☐☐☐☐

Expiration Date _____

Signature _____

If you are using a credit card, you can enter your order by calling
TOLL-FREE: 1-800-544-3712
(In Pennsylvania, call collect: 215-768-0388)

Address shown is: ☐ Home ☐ Business

☐ Check here if you do not wish to receive promotional mail.

Please indicate your business, title, and computer involvement below. Circle one number in Categories 1 and 2 and all that apply in Category 3.

1. **BUSINESS/INDUSTRY**
   End Users
   10. Manufacturer (other than computer)
   20. Finance/Insurance/Real Estate
   30. Medicine/Law/Education
   40. Wholesale/Retail/Trade
   50. Business Service (except DP)
   60. Government — State/Federal/Local
   65. Public Utility/Communication Systems/Transportation
   70. Mining/Construction/Petroleum/Refining
   75. Other User _____ (Please Specify)

   Vendors
   80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   85. Computer Service Bureau/Software/Planning/Consulting
   90. Computer/Peripheral Dealer/Distributor/Retailer
   95. Other Vendor _____ (Please Specify)

2. **OCCUPATION/FUNCTION**
   11. President/Owner/Partner/General Manager
   12. VP/Assistant VP
   13. Treasurer/Controller/Financial Officer
   21. Director/Manager/Supervisor DP/MIS Services
   22. Director/Manager of Operations/Planning/Admin. Serv.
   23. Systems Manager/Systems Analyst
   31. Manager/Supervisor Programming
   32. Programmer/Methods Analyst
   35. OA/WP Director/Manager/Supervisor
   38. Data Comm. Network/Systems Mgmt.
   41. Engineer/Scientific/R&D/Technical Mgmt.
   51. Manufacturing Sales Reps/Sales/Marketing Mgmt.
   60. Consulting Management
   70. Medical/Legal/Accounting/Management
   80. Educator/Journalist/Librarian/Student
   90. Other _____ (Please specify)

3. **COMPUTER INVOLVEMENT**
   Types of equipment with which you are personally involved either as a user, vendor or consultant (circle all that apply).
   A. Mainframes/Superminis
   B. Minicomputers/Small Business Computers
   C. Microcomputers/Desktops
   D. Communications Systems
   E. Office Automation Systems

Computerworld Guarantee:

I understand that I may cancel my subscription at any time, and request a full refund of the unused portion of my subscription.

Fill in and return to: P.O. Box 1016, Southeastern, PA 19398

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

8A07-01

COMPUTER INDUSTRY

Retailers say Apple glut not in evidence on store shelves

By Kathleen Burton
CW West Coast Bureau

CUPERTINO, Calif. — There is no inventory glut of Apple Computer, Inc. products at the retail level, dealers and industry analysts said in the wake of Apple's announcement that it plans one-week shutdowns at manufacturing plants in order to correct swelled inventories.

Apple announced recently [CW, March 11] it will close four factories for one-week periods during March and April because of an oversupply of computers brought about by sluggish sales that it claimed are affecting the entire computer industry.

"The Apple dealers I've talked to aren't reporting an inventory overload on Macintosh or Apple II products, and this raises questions about where the excess inventory really is," said Michael Murphy, editor of the San Francisco-based "California Technology Stock Letter."

Murphy said sales of the Macintosh had actually improved during February because of a number of factors. Buyers are anticipating the imminent release of Lotus Development Corp.'s Jazz software program, IBM's discounts on its PCjr have expired, and Apple is now offering dealers a $400 rebate on bundled Macintosh systems.

Murphy said the one-week shutdowns will cut Apple production by 13,000 Macintosh computers, 16,000 Apple IIc computers and 10,000 Apple IIe computers. "It isn't that much considering Apple will sell a million computers this year," he said.

Michele S. Preston, a securities analyst with L. F. Rothschild, Unterberg & Towbin in New York, said the excess Apple inventory is in Apple's warehouses, not on retailer's shelves as the company has implied.

See EXCESS page 86

IBM regroups, appoints execs

ARMONK, N.Y. — IBM recently announced it has replaced its Information Systems and Technology Group with two new organizations and has made a number of related management changes.

According to John Akers, president and chief executive officer of IBM, "The new Information Systems and Storage Group will sharpen our focus on high-performance processors, storage and programming. The Information Systems Technology Group will concentrate on leadership in the semiconductor and packaging technologies that are essential across all areas of our business."

The Information Systems Technology

See IBM page 90

Piracy charged

BPI sues Kwik Kopy

AUSTIN, Texas — BPI Systems, Inc. announced recently it has filed suit in federal court here accusing Houston-based Kwik Kopy Corp. of illegally copying and distributing BPI software.

The suit alleges that since 1981 Kwik Kopy has required an estimated 900 franchises to purchase from the corporation general ledger and accounts receivable software for use on Apple Computer, Inc.'s Apple II+. BPI said those packages were pirated versions of BPI's general ledger and accounts receivable programs.

A spokesman for Kwik Kopy declined to comment.

BPI asked the court for actual damages

See SUIT page 87

Regionals seen cultivating diverse styles

By James Connolly
CW Staff

Last of a three-part series

They are still more alike than different, "like the difference between 11 and 12 on the face of a clock," but the former AT&T regional holding companies will drift apart as the years go by, according to an industry research firm.

John Malone, president of the Eastern Management Group, took a look at the regional holding companies as an industry and as individuals and noted, "We find that each one of the holding companies has realized that they don't have to continue the momentum established in the 100 years of the Bell System. They are establishing their own ways, at least in subtle ways, with each company pursuing [its] own direction in areas best suited for [it]."

He offered a capsule summary of each company:

■ U.S. West — "Clearly the most aggressive at moving into new areas," it considers itself a holding company that happens to own telephone companies, while other regionals see themselves as telephone companies branching out. The attitude is dictated by geography, as U.S. West serves a thinly populated region of the nation. Its various ventures include nationally marketed customer premise equipment (CPE), installation and international cellular telephone deals.

■ Pacific Telesys Group — "Because of its relationship to the high-tech basin

See SHIFT page 81

■ The private investor who bought out the Basic Four computer systems division of Management Assistance recently swept out key executives, but said he plans to keep the new company on its present course/82

■ AT&T announced an agreement to buy 10% of software vendor Intermetrics, and the two companies said they will cooperate on opportunities in the U.S. federal government market/84

■ Honeywell announced the sale of its Japanese subsidiary to its former Japanese protege, NEC Corp./85

Chip book-to-bill slump prompts criticism of figure's worth

INDUSTRY INSIGHT
Kathleen Burton
CW West Coast Bureau

The recent decline in the book-to-bill ratio, traditionally the primary indicator of the semiconductor industry, has prompted criticism from nervous vendors and others who said the figure misleads the general public and Wall Street investors.

Theoretically, the book-to-bill ratio balances the relationship between bookings — the value of chips ordered during a three-month period — and the value of billed, and presumably shipped, semiconductors.

However, the final figure is sometimes confusing. A rising book-to-bill ratio may mean that shipments are rising but not as fast as orders. Or it could mean that orders are falling, but shipments are falling faster.

In theory, a book-to-bill ratio over 1:0 usually indicates a healthy chip industry. A book-to-bill ratio below 1:0 is an indicator of ill health. But those who believe that the number summarizes every force in the industry are like baseball fans who only want to know the final score, said one Silicon Valley chip maker.

A survey of several Valley chip makers revealed several problems with the ratio:

■ It is distorted due to the end-of-quarter shipment rushes commonly used by vendors to make sales and quarterly profits look stronger.

■ Orders are averaged but shipments are not, and the resulting figure, some said, compares apples and oranges.

■ The addition of Japan's semiconductor statistics last July has muddied the data.

■ Some chip companies operate on 13-month years (as though every month had four weeks) and some chip manufacturers do not.

According to Gary Arnold, vice-president of finance at National Semiconductor Corp., people are as comfortable with the book-to-bill ratio as they are with the Dow Jones & Co. average, "so it stays." The primary fallacy of the ratio, he said, is that people believe it is a function of the amount of chips that are shipped. "If you closed the back door of an [integrated circuit] company and shipped nothing, you'd have a great number for that month [just as you would] if you shipped one [integrated circuit] and charged $1 for it," he said.

Arnold advocates factoring in several other items, including real dollar bookings compared with prior bookings and current capacity rates. Arnold said he prefers to use an integrated circuit industry computation called the business rate, which indicates orders and shipments over a 16-week time period. "This makes it easy to spot trends and take corrective action," he said.

According to Sheilah Sandow, communications director of the Semiconductor Industry Association, which publishes the book-to-bill figures, some industry observers make the mistake of using book-to-bill as the sole index of the industry's health. Sandow said industry watchers should supplement the book-to-bill with other indicators such as inventory backlog; price fluctuations across product lines; and "phantom bookings" — backlogged orders that will not be filled due to buyer cancellations. Other key statistics presently ignored by the ratio, Sandow said, included hiring trends and spending plans in the industry, new orders, current customer inventories and present capacity.

Analysts said the chip industry is not anxious to change or supplement the book-to-bill ratio, because companies are worried about sharing information with competitors. As long as chip manufacturers maintain secrecy and remain satisfied with the short-term gains made when the market is on a roll, they must live with the flawed book-to-bill ratio.

Regulating the offspring

Bell regionals seen caught in tug-of-war

Whether it is an asset or a handicap, each of the seven regional holding companies must deal with a half dozen or more regulatory bodies, several of which may offer conflicting opinions on the same issues.

Regulation comes into play when a divested Bell operating company wants to increase rates or offer a new service and when a regional wants to spin off a new subsidiary to sell computers.

Those having input into regulation include, at the federal level, U.S. District Judge Harold H. Greene, the Federal Communications Commission and the U.S. Congress, and, at the state level, the legislatures and public utilities commissions.

In a recent speech, Thomas E. Bolger, chairman of Bell Atlantic, charged that the regionals are "caught in the middle of a regulatory tug-of-war" and are "unable to compete under ground rules that don't apply to anybody else."

But according to W. Page Montgomery, a communications consultant at Economics and Technologies, Inc. of Sudbury, Mass., "[The regionals] may say that they are getting conflicting signals, but, on the other hand, it's to their advantage if they don't like the ruling they get from one body."

One federal official noted that it is becoming increasingly common for the regionals to shop for the regulatory forum where they think they have the best chance to win their arguments.

The official cited the example of the regionals asking Greene, rather than the FCC, to order $1 per line single-line access charges.

Greene, who has been bombarded with the regionals' requests for waivers from the Modified Final Judgment that would allow the regionals to enter new lines of business, has ceded authority for initial screening of those requests to the U.S. Department of Justice. Greene then decides whether to accept the department's recommendation.

Meanwhile, the FCC has authority to act on requests for changes in tariffed services, such as the recently approved requests for asynchronous-to-X.25 protocol conversion.

Montgomery said areas to be addressed by the regulators and the regionals are those of cost-based pricing and lifeline service. He noted that the regulators, who make political as well as economic decisions, recognize that most Americans can afford to pay for telephone service according to what it costs to provide that service. But he said the regionals also must take the initiative in developing criteria for determining who needs lifeline service as opposed to basic, subsidized telephone service.

According to Alan Pearce, a regulatory economist and president of Information Age Economics, Inc., in Washington, D.C., the financial success of the regionals in 1984 could cause them problems in 1985. "They did so well in their first year as independent operating companies that I see their financial results causing problems for them with state and federal regulators, even with Congress. For the past two years, all we had heard was [the regionals] crying poor mouth," Pearce said.

"They already have imposition of a $1 access charge in June 1986 for residences and another $1 in June 1986 for residences. The states and the FCC have clearly said they will freeze the access charges [at] $2, and I don't think the operating companies are going to get the increases they would like in 1986 and 1987," he said. "They face enormous, absolutely enormous problems," Pearce concluded.

Regionals' stocks 'neutral'

The numbers at the top say "profit," for the seven regional holding companies, but the bottom line for the investment community remains "neutral."

Like their former parent company, AT&T, which enjoyed an 11.2% stock price gain last year, all seven regionals saw their stocks gain in 1984, with gains in price per share ranging from 15.5% to 37.1%.

But despite the stock gains and earnings ranging from Pacific Telesys Group's $828.5 million to Bell South's $1.26 billion, the newsletter "Notes for Portfolio Managers," published by L. F. Rothschild, Unterberg and Towbin of New York, rates the regionals' stocks as "neutral." Rothschild said several of the regionals have appeal for conservative or income-oriented accounts, noting that fundamental uncertainties remain.

Investors' concerns include whether the regionals, some of which have cut more than 10,000 employees since divestiture, can continue to streamline their operations; the success of various new ventures in the nonregulated arena; the threat of bypass; and regulatory issues, including rate increases pending before state regulators for most of the regionals' 22 divested Bell companies.

DRIFT from page 79

in California, it may become the most progressive in terms of capitalizing on new technologies." It appears to be focusing on enhancing Centrex service and integrating data processing with telecommunications. It may venture into the retail telephone and computer arenas, while minimizing its efforts to provide more than dial-tone service to the residential customer.

■ **Southwestern Bell Corp.** — "They may be the most conservative of the regional operating companies in terms of their approach to new opportunities. It may be meaningful that when the other companies were choosing names that sounded like airlines, Southwestern Bell stayed with Southwestern Bell."

The company has concentrated on intra-Local Access and Transport Area call handling, with digitized networks in growth areas of the country like Dallas and Houston, but so have the others.

■ **American Information Technology** (Ameritech) — "With Ameritech we see little differences, No. 1 in terms of dealing with the business customer. Its CPE program revolves around Centrex, while with others, the PBX [private branch exchange] is the flagship." It is pursuing the data processing market and the cellular market, having more cellular experience than the other regionals.

But its network enhancement may lag because it is in a nongrowth area where laying miles of fiber is not easily justified. Its network enhancements will focus more on the central office switch.

■ **Nynex Corp.** — "Nynex has been a real surprise, perhaps the biggest surprise. Twelve months ago, 18 months ago, nobody expected much out of Nynex, but its CPE, its move into the data processing arena and its retail efforts have been surprises." Nynex is investing heavily in its central offices, adding digital switches and making less progress in the network itself.

■ **Bell Atlantic** — "It's a very different type of company. It's pursued some types of business that other companies haven't even thought of. What we see them doing is trying to pick up enough business so they can become a full, turnkey, cradle-to-grave company for not only telecommunications but data processing as well."

Its ventures include third-party maintenance, with the purchase of Sorbus, Inc., from Management Assistance, Inc., and leasing. Like Ameritech and Nynex, its population migration is outward, so fiber installations tend to be on its own equipment, with customer premises wiring only upon request from the customer.

■ **Bell South** — "There is a strong commitment to the telephone company here. It's the only area of the country where people said they would rather buy from the telephone company than from AT&T, so there will be a strong reliance on CPE." Situated in a growth area, Bell South has to do a lot of new wiring and has found it can install fiber for 10% less than cable.

Watch for more movement on the office automation side, because the company has been PBX-oriented and is now looking at PBXs that will require a data application to justify their purchase.

LeBow vows steady course after MAI housecleaning

By Kathleen Burton
CW West Coast Bureau

TUSTIN, Calif. — After recently sweeping out key management executives from MAI/Basic Four Information Systems, Inc., the firm's new owner and acting president, Bennett S. LeBow, said he intends to keep the former computer systems division of Management Assistance, Inc. (MAI) on its current course.

Spun off during the liquidation of MAI, the new company fired Steven J. Keene, long-time MAI/Basic Four president, and Joseph Barsa, international sales vice-president, on March 3, just over a month after the company was purchased by LeBow, a private investor.

LeBow said the company's new product strategy and customer base would remain the same and that he is "committed to returning the company to profitability and [correcting] last year's minor mismanagements.

LeBow

"It was time to make a change," LeBow remarked following the management reorganization. He said the fired executives "had been at the company too long and were set in the old company ways." LeBow and William Weksel, an associate from LeBow's New York-based investment company, LeBow Industries, Inc., will temporarily head MAI/Basic Four until a new president is found.

A week prior to his dismissal, Keene had expressed optimism about the company's future. "We're in excellent shape," he said. "We're really a $300 million start-up with none of a start-up's disadvantages." Keene said the company's business plan would continue to target vertical markets — such as manufacturing and retail — that had made the company successful in the past. "We plugged some of the holes in our product line with the [Series 2000 multiuser microcomputer] introduction last November, and we're committed to getting more new products in the pipeline this year," he said.

LeBow, who said he is the sole investor in the new company, purchased MAI/Basic Four, based here, in January from MAI for $30 million in cash and $75 million in securities.

Although the firm was financially beleaguered last year, with operating losses of $10.2 million on sales of $260.1 million, LeBow said he was attracted to the company because of products under development, revenue potential projected at $280 million for fiscal year 1985, an installed base of 28,000 users, name recognition in the marketplace and a sales and distribution network in 30 countries.

Company officials said 1984's financial setbacks were based on nonoperational factors, including unfavorable foreign exchange rates, legal fees and the cost of advertising to counter the adverse publicity brought on by last year's proxy battle at MAI that resulted in the liquidation of its assets.

But company insiders privately conceded that the company's poor financial showing owed to mismanagement, a new product line that was late getting to the market, corporate headquarters overhead of $9 million and the drain on corporate coffers by a software retail operation in Albuquerque, N.M., that was dissolved in 1984 after losing $13.5 million for the year.

> "*'[The fired execs] had been at the company too long and were set in the old company ways.'*
>
> — Bennett S. LeBow
> MAI/Basic Four Information Systems, Inc.

Elliott Schneider, an analyst with Gruntal & Co. in New York, said MAI's troubles over the last two years primarily owed to management's failure to research new products. "The company was a sitting duck for Edelman," Schneider said, referring to last year's proxy battle begun by arbitrageur Asher Edelman.

LeBow's company will continue to manufacture and market the MAI/Basic Four line of computer systems, including the recently introduced Series 2000 and the Series 8000 multiprocessor business management system. Maintenance of MAI/Basic Four systems will be handled in the U.S. by Sorbus, Inc. — MAI's former Sorbus Service division sold to Bell Atlantic.

According to Fred D. Anderson, MAI/Basic Four's vice-president of finance, the company may take a write-down of noncurrent assets following the recent $24 million sale of its Canadian operation, MAI Canada, Inc., to Bell Atlantic that would reduce LeBow's purchase price by $7.7 million.

How to advertise in every major computer market in the world as easily as you advertise in the U.S.

CW INTERNATIONAL Marketing Services will help you penetrate the most profitable computer markets worldwide — easily, effectively, and economically.

Your ads will receive the attention they deserve. Our network of more than 55 computer publications in 25 countries is the largest in existence. Over 9,000,000 computer-involved people read our publications every month.

With more than 10 years experience in international marketing, we're the only service of our kind. We can help you make your ads more effective. Our local offices can translate your ads for a 15% surcharge on the space you purchase.

We'll help you increase your market penetration. Because we place your advertising through our U.S. office, you won't have to pay the VAT (value added tax, ranging from 8-20% of your ad-space purchases) which is regularly charged on all advertising placed abroad. And you'll be able to advertise in even more markets when you take advantage of our corporate discounts.

We're also available to advise you on your campaign strategy — such as when to advertise in order to coincide with special-focus issues and trade shows.

All you need to do is send us your advertising materials. We'll handle all the transactions. And we'll bill you in U.S. dollars so you won't have to worry about exchange rates.

Call Diana La Muraglia today if you want to reach the computer buyers in any of the following countries: Argentina, Australia, Brazil, Canada, Chile, Denmark, Finland, France, Greece, India, Israel, Italy, Japan, Korea, Mexico, Norway, People's Republic of China, Saudi Arabia, South Africa, Southeast Asia, Spain, Sweden, The Netherlands, United Kingdom, Venezuela and West Germany.

You can reach her toll-free at (800) 343-6474. In Massachusetts call (617) 879-0700. Or you can reach her through Telex, at number 95-1153. Or, if you prefer, fill out the coupon below and return it today. Do it now. The sooner we hear from you, the sooner you'll hear from our readers.

CW COMMUNICATIONS/INC.

Diana La Muraglia
General Manager
CW International Marketing Services
375 Cochituate Road, Box 880
Framingham, MA 01701

☐ **Please send me more information about your International Marketing Services.**
☐ **Please have a sales representative call me.**

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____

TRW inks pact to buy Ultimate

FAIRFIELD, N.J. — TRW, Inc. recently announced that it has reached an agreement in principle to acquire Ultimate Computer Services, Inc., a supplier of reconditioning and refurbishing services for used IBM equipment.

Under the agreement, Ultimate will become part of TRW's Customer Service Division, a provider of maintenance and repair services to users of computers and related electromechanical systems.

TRW will acquire Ultimate's Rockaway, N.J., and Bensonville, Ill., refurbishing and storage operations and field engineering operations located in New York and three New Jersey locations.

TRW's Customer Service Division, headquartered here, employs 2,800 service professionals and claims more than 100,000 customers throughout North America.

Intel files against NEC

SANTA CLARA, Calif. — Intel Corp. recently announced that it filed suit against Sunnyvale, Calif.-based NEC Electronics, Inc., a subsidiary of NEC Corp., alleging that the company had violated Intel's copyrights on its 8086 and 8088 microprocessors.

Intel claimed that the microcodes on two NEC Cmos microprocessors, the V20 and V30, announced by NEC last April, are duplicates of Intel's 8086 and 8088 microprocessors. Tom Dunlap, Intel's general counsel, said, "We have reviewed the NEC V series microcode and have concluded it is sufficiently similar to infringe the copyrights on our products."

Though NEC's microprocessors were developed overseas, the company recently announced plans to import and market the products in the U.S., according to Bob Hinkley, NEC's legal counsel.

Hinkley said that NEC filed suit in San Jose, Calif., federal court last December, seeking to bar Intel from suing NEC once V series sales began in the U.S. He added that NEC's products are enhanced, yet substantially different versions, of Intel's 8086 and 8088 products.

Hinkley said an investigative period by both companies will be followed by a trial in San Jose federal court.

AT&T agrees to acquire 10% of Intermetrics

BERKELEY HEIGHTS, N.J. — AT&T recently announced it has agreed to acquire a 10% interest in Intermetrics, Inc., a software services and products vendor, and that the two companies have reached agreement in principle on a plan for pursuing mutual business interests in the U.S. federal government market.

Under the agreement, which is subject to approval by the boards of both companies, AT&T would acquire 10% of Intermetrics' outstanding shares at $8.25 a share, or more than $2 million. AT&T would be granted an option to increase its ownership share to 20% in one year for an undisclosed higher price. It also would acquire the right to obtain additional Intermetrics shares in the public market. However, it would be prohibited from acquiring more than 30% of all Intermetrics' shares during a three-year period.

Based in Cambridge, Mass., Intermetrics employs 600 people at 10 locations in the U.S. In the fiscal year just ended, the company was operating at an annualized revenue level of $42 million, based on the first nine months.

The company will pursue federal market opportunities in concert with AT&T's Federal Systems division.

The arrangement is subject to approval by the boards of directors of both companies. The final agreement is expected to be completed by the end of the month.

NEC to buy Honeywell Japan

MINNEAPOLIS — Honeywell, Inc. announced recently that it will sell its Honeywell Information Systems Japan subsidiary to NEC Corp. Terms of the sale were not disclosed.

Honeywell Information Systems Japan, based in Tokyo, distributes and supports Honeywell's medium and large computer systems in the Japanese market. Honeywell and NEC have had a lengthy relationship that started with NEC marketing Honeywell products.

This relationship has evolved to the point where Honeywell markets NEC's large-scale computer systems in the U.S.

Honeywell said Honeywell Information Systems Japan employees will transfer to NEC, where the business will be operated as a separate subsidiary.

According to the firm, NEC will distribute, maintain and provide support for Honeywell computer systems in Japan as part of a new distribution agreement to be signed by the two companies.

National Semi modifies shutdown; lays off 400

SANTA CLARA, Calif. — National Semiconductor Corp. recently announced it had decided to stretch a scheduled 10-day production shutdown over a 10-week period and said it would also lay off 400 employees because of the retooling of a manufacturing module at its Salt Lake City facility.

The company said it would implement four-day workweeks beginning March 17 at all North American and European operations. In January, the company had announced it would shut down for two weeks in April to keep inventories in balance while the semiconductor industry tries to recover from a severe and prolonged sales slump.

At the Salt Lake City facility, the company said it will shut down one production line for retooling and will be forced to lay off the workers there. When production resumes on that line, the furloughed workers will be given first choice for the new jobs, the company said.

Micro firm's exec hired from DEC

MOUNTAIN VIEW, Calif. — The former group manager for Digital Equipment Corp.'s Rainbow microcomputer product was recently appointed by Sun Microsystems, Inc., to the position of vice-president, East Coast engineering.

Barry J. Folsom led the DEC group that developed the Rainbow 100 models. DEC recently announced a production halt of the Rainbow and later announced a repackaged version.

Sun Microsystems said the appointment represents the company's strategy of establishing a strong engineering presence on the East Coast.

The company said Folsom will be involved in recruiting from the pool of engineering talent graduating from leading East Coast universities and will closely serve Sun Microsystem's East Coast customers.

"Are you the one with the short in your computer?"

How to play hardball in software.

The growth of applications software packages for micros through mainframes continues to boom because of the market's enormous appetite for solutions.

The scope of available packaged software, and its evaluation, is becoming an increasingly important part of the MIS/DP management function. They often need to choose from dozens of programs for every application they have in mind.

That's where *Computerworld Focus* comes in. With the May 8th issue on Software: Applications. We'll sort out what's available. Discuss where the trends are leading. Uncover the true innovations. Explain the differences between first and second generation software. Look into micro-to-mainframe links. And, in general, provide some guidelines for readers to evaluate their own problems. And the solutions.

And *Computerworld Focus* will reach over 126,000 paid *Computerworld* subscribers with that information. Not to mention our high pass-along readership. And bonus distribution at COMDEX/SPRING in Atlanta.

So if you want to play hardball in software, now's the time. Get your ad in Focus. *Computerworld Focus*. The May 8th issue. Closing March 29th (materials are due one week later).

For more information, contact Ed Marecki, National Sales Director, *Computerworld Focus*, 375 Cochituate Rd., Framingham, MA 01701, (617) 879-0700. Or call your local sales office listed below.

COMPUTERWORLD FOCUS

We put the hottest issues of the day in Focus.

Signetics chief resigns

SUNNYVALE, Calif. — Charles C. Harwood has resigned as president and chief executive officer of Signetics Corp. of Sunnyvale, Calif., just days after the semiconductor company announced it will lay off as many as 400 U.S. employees by the end of this month.

Harwood said his decision to leave the firm April 1 is not related to the layoffs.

"I've been thinking about this for two years," he said. Harwood said his decision was based on the fact that he has headed Signetics for more than 14 years. "I felt it was time for a change for myself and for the company," he said.

Harwood said the company is "in good shape and will ride out the semiconductor industry's hurricane."

Signetics' shortened workweek and the layoffs are responses to the semiconductor industry's slump.

No successor to Harwood has been named. Norman A. Neumann, executive vice-president of U.S. Philips Corp., Signetics' parent company, will temporarily take over as CEO.

Harwood will join a new firm, Quality Improvement, Inc., of Palo Alto, Calif., as a partner. The company will offer courses in improving the quality of management and technology. Harwood said this is an area of interest for him, adding that, while at Signetics, he promoted the reduction of chip defects by discovering problems during production instead of catching them during the inspection process.

During his tenure at Signetics, annual sales grew from $31.5 million in 1970 to $720 million in 1984. Signetics is owned by the U.S. Philips Trust, whose beneficiaries are the shareholders of N.V. Philips of the Netherlands.

SUIT from page 79

of up to $711,000 and punitive damages of $1 million, in addition to an injunction barring Kwik Kopy from making or distributing any additional copies of BPI software.

Peter H. Mills, senior vice-president of BPI, said the alleged piracy was discovered in late 1984 when a BPI salesman was in a Kwik Kopy franchise and was shown the Kwik Kopy software in operation. The salesman recognized that the package was identical to BPI's program, Mills said.

BPI met with Kwik Kopy representatives twice in an attempt to resolve the conflict, Mills said.

"If you ask me, they're nothing but dust collectors."

EXECUTIVE CORNER

Harry Taxin has been named president and chief operating officer of Cubicomp Corp.

■

Michael Hackworth has been appointed president and chief executive officer at Cirrus Logic, Inc. Hackworth was previously with Signetics Corp., where he held management, marketing and sales positions for 13 years.

For the past five years, Hackworth served as senior vice-president in charge of Signetic's MOS and linear marketing, manufacturing and technology programs. Before that, he was in charge of its field sales and bipolar digital marketing.

■

Kenneth Simonds has been appointed president and chief operating officer of Teradata Corp. Simonds joins Teradata from Amdahl Corp., where he left a position as executive vice-president. Prior to Amdahl, Simonds was employed for 18 years by IBM.

■

Jack Noonan has been named vice-president of technical services of the computer services division at Candle Corp. Noonan was vice-president of corporate product support and services for Amdahl Corp.

■

Arthur D. Little, Inc. announced that its board of directors has elected two vice-presidents. The new officers are Thomas Gunn, manager of the computer-integrated manufacturing section, and Arthur Solomon, manager of the telecommunications section.

■

Roy Wright has joined Corvus Systems, Inc. as chief operating officer.

■

Robert Reiser has been named group vice-president and president of international operations and has appointed Roger Levien as vice-president in charge of the corporate strategy office at Xerox Corp.

■

Richard Swee has been named director of software development at Charles River Data Systems. Swee joined Charles River after 14 years with Honeywell, Inc., where he managed network development departments.

EXPERIMENTS

GTE Data Services, Inc. has established a commercial services division to market products and services to the telecommunications industry. Richard McMichael has been named vice-president and general manager of the new division.

The company, which is a subsidiary of GTE Telenet Communications Corp., provides data processing and systems development services to GTE telephone companies through its 10 computer centers located across the country.

■

Northern Telecom, Inc. and Wang Laboratories, Inc. announced the successful completion of tests verifying the compatibility of Northern Telecom's SL-1 digital business communications system with Wang integrated information processing equipment.

The test results represent a major advance in Wang's development of a computer-to-PBX interface (CPI) for use with the SL-1. The CPI development, which is nearing completion, is part of an operating and development agreement that was signed by Northern Telecom and Wang in late 1983.

■

Hewlett-Packard Co. said it will establish a manufacturing operation in Barcelona, Spain, to produce graphics plotters for the European, Middle Eastern and African markets.

The operation is HP's first manufacturing facility in Spain. It will be part of the company's San Diego division where the operation's products, which have business and technical applications, are developed.

HP also announced it has named Wolf Michel as general manager of the Spanish operation, which will be called the Barcelona Peripherals Operation.

■

Valid Logic Systems, Inc. of San Jose, Calif., announced an agreement with Thomson-CSF of Saint Denis, France, for the manufacture of Valid computer-aided engineering workstations.

This four-year contract authorizes the Centre Electronics de Laval of Thomson-CSF to manufacture Valid computer-aided engineering workstations to be sold in Europe.

More than 50 companies that comprise this country's community of authorized vendors of stock exchange information have announced their decision to affiliate with the Information Industry Association (IIA), a 16-year-old trade group of information companies, rather than form their own association.

The financial vendors include such Wall Street companies as Monchik-Weber Corp., Stewart Data, International Marketnet, Telerate Systems, Inc., Track Data, Trade Center, Inc., The Option Group, U.S. Quotes and Reuters Ltd., among others including companies such as Dow Jones & Co., Quotron Systems, Inc. and Autex Systems.

Taking the name Financial Information Services Division, the stock exchange information vendors add a third division to IIA, along with Videotex and Database Publishing.

EXCESS from page 79

The industry's seasonal slowdown is not confined to Apple, Preston said, but Apple has been hit harder than rival IBM because of its heavier reliance on the consumer market, which normally slows down after Christmas. Apple straddles the home and business markets, and the home market has been hurt by skepticism about a computer's usefulness in the home, Preston said.

A survey of several computer chains, including Computerland Corp., Businessland, Inc., Gateway Computer and Computercraft, revealed that the Macintosh and Apple II products were selling at anticipated levels following the Christmas season.

Sue Crocker, spokeswoman for San Jose, Calif.-based Businessland, said she did not know why Apple was reporting excess inventory in the retail channel. "This is not the case at any of our franchises," Crocker said, adding that the Macintosh enjoyed strong sales in January and February, and sales are currently brisk in expectation of the Macintosh Office products rollout.

Greg Archer, manager of three Southern California Computerland franchises, said there was no inventory excess of Apple products at any of his stores. "Aside from the seasonal slowdown, sales have been as expected," he said. However, Archer said, sales of Apple products have fallen over the past year because of the abundance of computer outlets, mail-order discounters and independent retailers that compete with the full-service Apple dealers. "It seems like anyone can sell Apple [computers] now — even a kid with a lemonade stand," he said.

Armand Shapiro, senior vice-president of research and development at Houston-based Computercraft, said sales of Apple products at the franchise have been seasonally slow, typical of the after-Christmas period. "But it's not that serious," he said, "and should correct itself."

Aside from the seasonal slowdown, Shapiro blamed flat Apple II sales on pressure from IBM's PCjr; he said Macintosh sales problems owed to competitive IBM pricing and the lack of software available for the Macintosh at Christmas. But more software is available now, he said.

An Apple spokesman said inventory had built up in the company's six regional distribution centers and that dealer orders were weak.

IBM reassigns Estridge to manufacturing

ARMONK, N.Y. — IBM announced Feb. 12 the reassignment of Philip D. Estridge, the executive who managed a small microcomputer development group that in 1981 announced the IBM Personal Computer and evolved into the Entry Systems Division.

Estridge, a corporate vice-president, was named vice-president of manufacturing with staff responsibilities for the company's worldwide manufacturing strategies.

He was succeeded as president of Entry Systems Division by William C. Lowe, who was formerly assistant group executive for IBM's Information Systems and Communications Group. Estridge replaced Edward M. Davis, who earlier was named president of the Data Systems Division of IBM's Information Systems and Storage Group.

An IBM spokesman last week said the move reflected a shift of responsibilities and declined to say whether Estridge's assignment was a promotion. IBM also denied speculation of corporate dissatisfaction with the Entry Systems Division.

IBM from page 79

Group includes the general technology division, which manufactures logic, memory and special semiconductor devices and multilayer ceramics; and the system technology division, which manufactures circuit packaging, develops and manufactures intermediate processors and printers and develops programming systems.

The Information Systems and Storage Group includes the data systems division, which is responsible for the development, manufacture and associated programming for large complex systems; and the general products division, which is responsible for the development and manufacture of storage systems.

Paul J. Rizzo, IBM vice-chairman, was named review executive for the operations of IBM's worldwide marketing and service units, a responsibility formerly held by Akers.

Review executive named

Jack D. Kuehler, senior vice-president and formerly group executive under the replaced structure, was appointed to IBM's business operations committee, with new responsibility as review executive for the worldwide development and U.S. manufacturing operations of IBM's product groups.

John E. Bertram, vice-president and former president of the general products division, was named group executive for Information Systems Technology Group and was appointed as a member of the corporate management board.

John P. Cunningham was named assistant group executive for plans and controls for Information Systems Technology Group.

Group executive appointed

Carl J. Conti, vice-president and former president of the data systems division, was named group executive of Information Systems and Storage.

IBM vice-president Edward M. Davis was named data systems division president.

Ray S. Anuszyyad was named general products division president.

"No other single publication reaches the computer marketplace like Computerworld."

Bob Gildenberg, Vice President, Marketing, Philon, Inc., NY, NY

Bob Gildenberg is Vice President of Marketing for Philon, Inc. He is responsible for marketing fast-executing compilers for UNIX-based microprocessors. To sell his product, PHILON FAST/Compilers, he has to talk to executives at hardware manufacturers, software houses, systems integrators and VAR's, as well as government and selective end-user organizations.

He has found, through experience, that even though Computerworld is primarily positioned as an MIS/DP publication, it does the job for him.

"We didn't have as much money as we would have liked when we started, and rather than spreading our ads throughout several books, giving us a weak presence in each, I chose to concentrate in Computerworld. It was my sense that it reached most of the people I needed to talk to. And its weekly frequency would allow us to roll out faster than we could have with most other publications. The results have shown that judgement to be accurate.

"More than 30 major hardware manufacturers have already signed up to distribute PHILON FAST/Compilers. In addition, many software companies will be using our compilers to speed development of their own products. So far we have exceeded our sales forecasts and have increased next year's forecast by over 300%."

If you're trying to reach executives in the computer industry to tell them about your product or service, look to Computerworld. We cover the entire computer world. Every week.

Call your Computerworld representative for all the facts. Or call Ed Marecki, National Sales Manager at 617-879-0700.

Sales Offices

Boston: (617) 879-0700
Chicago: (312) 827-4433
New York: (201) 967-1350
Atlanta: (404) 394-0758
Houston: (713) 952-1220
San Francisco: (415) 421-7330
Los Angeles: (714) 261-1230

COMPUTERWORLD

NICKELS AND DIMES

T-Bar, Inc. announced revenue for the year ended Dec. 31 of $40.9 million, up 19% from $34.5 million in the same period one year earlier. Profits were $1.6 million, or 40 cents per share, compared with $782,000, or 20 cents per share, in 1983.

■

Minister Systems Corp. reported fourth-quarter revenue of $9 million, compared with $7.4 million in the same period last year. The company posted a net loss of $3.3 million, or 21 cents per share, compared with a net loss of $3.8 million, or 25 cents per share, for the prior year's period. For the year, the company posted revenue of $26.2 million, compared with $21.8 million in 1983, and a loss of $17.3 million, or $1.11 per share, compared with a loss of $10.2 million, or 76 cents per share, in 1983.

■

Informatics General Corp. reported revenue of $191.1 million for the year ended Dec. 31, compared with $153 million in 1983. Profits were $6.2 million, or $1.12 per share, compared with $5.7 million, or $1.10 per share, in 1983. The company's fourth-quarter profits were $3.7 million, or 69 cents per share, on revenue of $56.9 million; in 1983, the company's profits were $3.7 million, or 68 cents per share, on revenue of $47.6 million.

■

Amacomp, Inc. reported first-quarter revenue of $31.5 million, compared with $34.8 million in the same quarter last year. The company posted a first-quarter net loss of $2.5 million, or 16 cents per share, compared with a net loss of $37.1 million, or $2.93 per share, a year earlier.

■

Communications Satellite Corp. reported revenue for 1984's fourth quarter of $120.3 million, compared with $107.7 million in the corresponding quarter last year. Profits were $14.3 million, or 79 cents per share, compared with $8.7 million, or 47 cents per share, in the corresponding period one year earlier. For the year, the company reported revenue of $442.3 million, compared with $440.4 million in 1983, and profits of $51.2 million, or $2.83 per share, compared with $50.1 million, or $2.77 per share, in 1983.

■

Scientific Micro Systems, Inc. announced revenue for the year ended Dec. 31 of $41.1 million, compared with $22.8 million the year before. Profits were $3.3 million, or 53 cents per share, compared with $2.4 million, or 46 cents per share, in 1983.

■

Silvar-Lisco announced revenue for the third quarter ended Jan. 31 of $4 million, an increase of 32% over the $3.1 million figure reported for the period last year. Profits were $205,000, or 3 cents per share, compared with $178,000, or 4 cents per share, for the corresponding quarter one year ago.

■

Zentec Corp. reported a profit for the fourth quarter ended Dec. 31 of $129,000, or 3 cents per share, compared with a loss of $1.6 million, or 49 cents per share, in the same quarter one year ago; revenue was $5.3 million, compared with $5.8 million in the corresponding 1983 quarter.

■

Perkin-Elmer Corp. announced that revenue for the second quarter ended Jan. 31 increased 13% to $329 million from $291 million a year ago. Profits were $18.7 million, or 42 cents per share, compared with $14.3 million, or 32 cents per share, in the same period last year.

■

Ucccl Corp. reported profits for the three months ended Dec. 31 of $3.9 million, or 24 cents per share, compared with $1.2 million, or 7 cents per share, in the comparable period one year earlier. Revenue was $48.7 million, compared with $44.5 million in the corresponding quarter one year ago. For the year, the company posted profits of $7.9 million, or 49 cents per share, on revenue of $173.4 million, compared with 1983 profits of $187,000, or 1 cent per share, on revenue of $152.9 million.

■

Miniscribe Corp. reported a net loss of $5.7 million for 1984 on revenue of $123.6 million. During the previous year, Miniscribe earned $4.7 million, or 28 cents per share, on revenue of $76.5 million.

■

Data I/O Corp. announced profits for the fourth quarter of $957,000, or 9 cents per share, compared with $1.7 million, or 16 cents per share in the corresponding period a year earlier. Revenues were $13.1 million, compared with $11.5 million in the same quarter one year ago.

■

Computer & Communications Technology Corp. reported revenue for the fourth quarter of $33.2 million, up 58% over the comparable period last year. Profits were $3.2 million, or 42 cents per share, compared with a year-earlier loss of $27.3 million.

■

Gerber Scientific, Inc. reported profits for the third quarter ended Jan. 31 of $6.2 million, or 36 cents per share, an increase of 70% over $3.6 million, or 23 cents per share, in the prior year's quarter. Revenue was $52.5 million, compared with $41.6 million in the like period one year earlier.

■

Gerber Systems Technology, Inc., Gerber Scientific, Inc.'s 80% owned subsidiary, reported a loss of $566,000 for the period ended Jan. 31, compared with a net loss of $900,000 in the comparable period one year ago.

POSITION ANNOUNCEMENTS

Senior Database Application Analyst

San Francisco/Bay Area

We're Kaiser Electronics and our commitment is to design, develop and produce advanced cockpit display systems that meet critical real-time information needs in current and future airborne environments.

As a Senior Database Application Analyst you will be responsible for the lead of our Database Application Program development team. A BS degree in Computer Science or related field and a minimum of four years' experience in Database Applications is required. Hands-on experience in VAX/VMS, Pascal programming and group leadership is preferable.

Our outstanding benefits include 29 paid days off in your first year of employment, a profit sharing plan, and the kind of relocation policy that can put all the advantages of Kaiser Electronics and the Silicon Valley within your grasp.

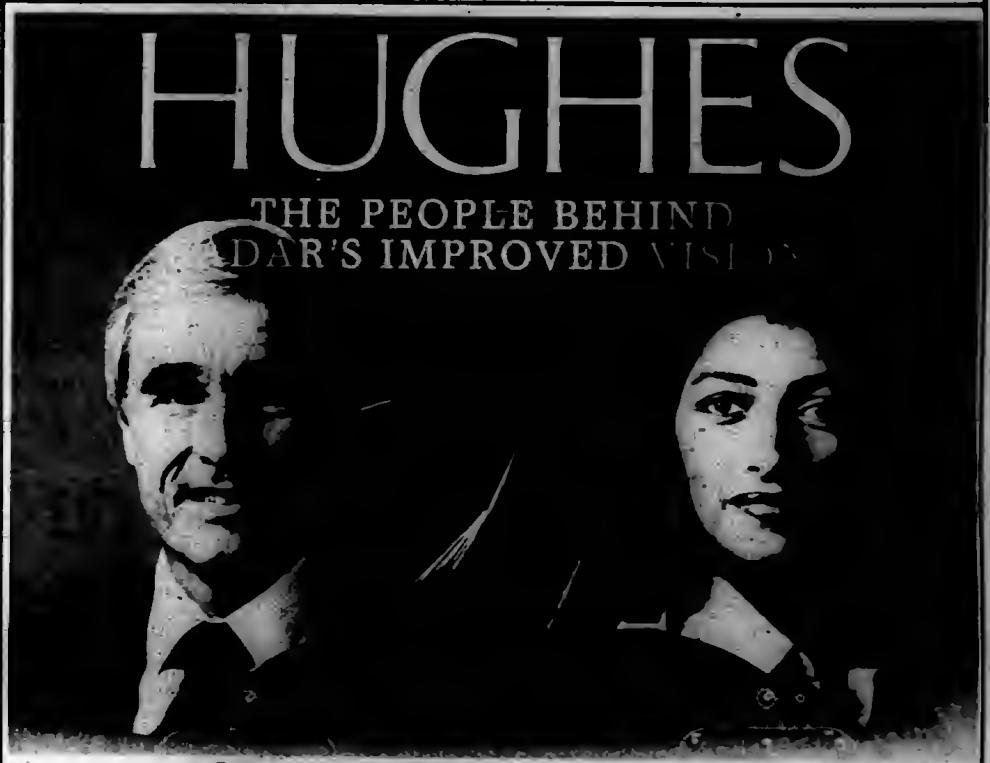
Qualified applicants are invited to call us collect at: (408) 946-3000, or send resumes to the attention of **Professional Employment, Kaiser Electronics, Dept. CW 171, 2781 Orchard Park Way, San Jose, CA 95134.** An Equal Opportunity/ Affirmative Action Employer

KAISER ELECTRONICS

SR. SYSTEMS ANALYST

Major Central NY metals fabricator is actively searching for degreed sr. analysts w/min. 3 yrs. mfg. exp. Preferred bkgrd. incl. knowl. of OS/MVS, MRP & Cullinet mfg. sys. This is an excellent oppty. to join a prosperous co. & enjoy easy living in sm. college community. To $40,000.

ROBERT HALF
OF BUFFALO, INC.
420 Main Street
1310 Liberty Building
Buffalo, NY 14202
(716) 842-0801
Personnel Agency



CREATE NEW HORIZONS

Talented...determined...proud. The people behind Hughes Radar Systems Group are leading the challenge to new technical horizons. In an environment that stimulates and actively supports a diversity of technical contributions. Scientific resourcefulness... coupled with creative engineering. These people have made it an art.

At Radar Systems Group, Hughes people forge new frontiers in aerospace radars, weapon control systems and avionics, airborne displays, aero-vehicle data links and airborne electronic countermeasures equipment. Scientific explorations that extend radar technology's vision far beyond today's horizons.

At Hughes, there is a stimulating relationship between the people and their work. Between the individual and the team... the team and the group... the group and the company. A relationship that provides opportunity for substantial individual contribution. That's what Hughes Radar Systems Group is all about. People. People with vision and dedication. People participating in extraordinary ways.

People like you.

People experienced in design, development and manufacturing. Applying your talent to systems engineering, project/ program management, design of circuits and mechanisms, and bringing these concepts to reality through the application of advanced manufacturing processes.

You are invited to call (213) 647-4900, collect, or send your resume to: Hughes Radar Systems, Engineering Employment, P.O. Box 92426, Dept. WC-3C, Los Angeles, CA 90009. Proof of U.S. Citizenship Required. Equal Opportunity Employer.

HUGHES

RADAR SYSTEMS GROUP

NEW ENGLAND

From the Sandy Beaches of Cape Cod to the Snowy Slopes of Vermont, WE COVER NEW ENGLAND! The professionals from our 6 conveniently located offices will put you in touch with exciting career opportunities with clients that range from Fortune 100 Companies in Major Cities to Small Shops in quiet Country Settings. We Need Professionals With Experience On: Sys. 38 (25-30 openings at all times), IBM OS & DOS, Burroughs, Unix, "C", HP 3000.

PositionsInc.

117 Park Avenue, Suite 201, West Springfield, MA 01089
or Call Collect BILL MALLORY (413) 781-3412

VICE PRESIDENT MIS

Banking

Major retail bank requires system development manager with prior hands-on experience managing bank operations. Qualifications require to manage 200+ person department and direct many projects at once. Compensation near 6 figures, urban location.

Reply to CW-84617
Computerworld
Box 880
Framingham, MA 01701

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

UNITED HAS THE WINNING FORMULA

FOR CAREER SUCCESS!

Leadership, aggressiveness, promotion from within — that's the winning formula at United Airlines. United is the nation's #1 airline. Our success is based on the aggressive development of sophisticated computer operations to help better support management decisions throughout the corporation. For career-oriented professionals, that environment offers exceptional opportunities for advancement, dual career paths into management and technical areas, and a highly comprehensive salary structure. Immediate opportunities are currently available for:

SR. OPERATING SYSTEMS PROGRAMMERS

Responsibilities will include performing OS diagnostics and system programming and maintenance (MVS/XA internals, SMP, JCL, IBM Assembler, Sysgen/IOgen). Candidates must have 3-5 years systems programming experience. A BS in Computer Science is preferred.

SR. PROGRAMMER ANALYSTS/PROGRAMMER ANALYSTS

Those selected will estimate and design enhancements, programs and/or functions from user requirements, research and resolve programming problems, and implement problem solutions. All candidates must have 2-5 years programming experience in a COBOL, OS/MVS environment. CICS/IDMS experience preferred. Strong analytical and interpersonal/communication skills are essential, a degree in Computer Science is preferred.

SYSTEMS DESIGN ANALYSTS

Challenging opportunities for those professionals with 3-5 years of progressive COBOL and CICS/IDMS programming experience. Responsibilities include assisting in the design of complex systems and systems interface plans.

TEAM LEADERS/APPLICATIONS PROGRAMMING

Involves analysis, planning and organization of large scale business applications in a COBOL, CICS, IDMS, MVS/OS environment. Will lead a team of P/A's in design, implementation and maintenance of business systems. At least 3-5 years project experience and strong technical knowledge required.

DATABASE DESIGN ANALYSTS

Responsibilities include introducing new database technologies, establishing direction for database architecture, and representing the database in complex systems analysis efforts. Candidates must have at least 3 years of large scale database development, application experience in an IDMS/CICS environment and a working knowledge of Cullinet's major software products. Strong analytical and excellent communication skills required. A degree is preferred.

United's winning formula could be just what you need for your career. Why not find out more. Send a resume, including salary history, in confidence to: Professional Employment/EXOPX-CCS, United Airlines, P.O. Box 66100, Chicago, IL 60666. Equal Opportunity Employer.

UNITED AIRLINES

Join The Computer Horizons IMS TASK FORCE Of Industry Elite In New Jersey & Florida

As a talented EDP Professional ready to make that major career move to Consultant status and eager to elevate your technical background, this is your big chance.

Computer Horizons Corp., the dynamically growing, publicly held and nationally respected consulting firm with offices all across the United States is once again expanding the CHC Task Force of Elite EDP Professionals to "spearhead" major projects for clients located throughout New Jersey and Florida.

We are interested in Sr. Programmer Analysts, Programmer Analysts and Programmers with design or implementation experience in IMS. In addition, we are interested in DP Professionals with an OS/COBOL or PL/1 background to be immediately put into our intensive IMS training course which will enable you to become part of our IMS Task Force.

Positions are currently available in Orlando and other major southeastern cities, as well as north, central and Southern New Jersey.

These positions are diverse and challenging every step of the way. The rewards are truly significant. Earnings from day one are far in the excess of industry standards and a comprehensive benefits program that includes life, health, major medical and dental insurance, unlimited tuition refund, plus relocation and travel assistance; also included is our deferred income savings plan. Please respond by calling or sending your resume to the area you are most interested in:

Jim Sanders
(305) 862-6666 (COLLECT)
COMPUTER HORIZONS CORP.
141 Douglas Avenue
Altamonte Springs, Fla. 32714

Barry Howard
(201) 599-7999 (COLLECT)
COMPUTER HORIZONS CORP.
4 Century Drive
Parsippany, NJ 07054

COMPUTER HORIZONS CORP.

An Equal Opportunity Employer M/F

Dunhill Means Experienced Systems Programmers, Analysts & Programmers

At Dunhill of Charlotte our only business is finding the right people for the job. We represent many of the largest and most respected corporations across the country. That's why we can offer the busy data processing professional the opportunity to explore the job market without doing any more than simply sending us a resume.

We are not asking you to make any commitment. There is never a fee with Dunhill of Charlotte, and all matters are held in strict confidence. What more could you ask for? We will also keep you up to date on industry trends and current salary ranges in the DP area.

Keep your career running in high-gear by letting Dunhill of Charlotte find the opportunity you have been searching for as a professional. We work to go to work for you today! We specialize in the placement of experienced Programmers, Analysts and Systems Programmers in the Carolinas and throughout the beautiful Southeast and Southwest. Give us a call now, or send your resume to:

Keith Raschle, CPC
Data Processing Consultant
5401 CARMEL ROAD
SUITE 107
CHARLOTTE, NC 28226
1-800-438-3612
In North Carolina call collect (704) 542-0312

Dunhill Of Charlotte, Inc.

An Equal Opportunity Employer M/F

Computers

Two new key managers for dynamic multi-hospital organization. Presently installed IBM 3081G using MVS/XA and ADS/PCS to support an extensive telecommunications network, including information center and PC network.

DEVELOPMENT CENTER DIRECTOR

Responsible for the implementation and maintenance of all purchased or locally developed systems. The successful candidate for this position must have solid background in human relations, project management skills, an extensive technical background in an MVS environment, and should be an expert in ADS/PCS.

USER SUPPORT CENTER DIRECTOR

Responsible for the coordination between users and information systems in the areas of the information center, office systems support and personal computing. This position requires strong people skills, good management skills, a solid background in hospital systems, and a solid technical background. Highly desirable is experience with FOCUS, and SAS and a knowledge of personal computers and their software. Experience with word processing and office systems is a definite plus, as would be experience with DB-OSS and 8100 DOSF.

Please send resume in confidence to:

Julie Halliday, Employment Mgr.
Sutter Community Hospitals
2800 L St., Suite 104
Sacramento, CA 95816

EOE M/F/H

Advanced Programming Resources, Inc.

Advanced Programming Resources, Inc., a dynamic growth-oriented contract services organization, is expanding into the South/Southeast region, and we have an immediate need for seasoned professionals.

One to five years experience plus a Bachelor and/or Master of Science degree in Computer Science is preferred, with exposure in the following areas:

- Local Area Networking
- Distributed Processing
- Structured Information
- Communication Protocol
- Robotics
- Graphics (CAD/CAM a plus)
- UNIX 4.2 BSD, System 3.5
- Structured Programming Languages (Pascal, C, PL/I & Assembly)
- High Level Communications in a Global Environment
- Microprocessor Firmware Applications

APR provides an excellent salary (35-45K range), along with fully paid company benefits. If you feel you want to join the leader, please call and/or send your resume in confidence, to: **ADVANCED PROGRAMMING RESOURCES, INC., 6000 North High Street, Worthington, Ohio 43085, (614) 888-3666.** An equal opportunity employer, m/f.

APR
ADVANCED PROGRAMMING RESOURCES, INC.

DATA LINK

COME TO NEW ENGLAND

and see what we have to offer!

New England has sailing, sailing, mountains, beaches, a Courier and free atmosphere, and a professional climate that is very exciting. I.e., PM's, S/P's, SW Eng's with experience in PDP, BITEL, HONEYWELL, IBM, WANG, A UNIX, C and graphics background is also desirable.

Send us your resume or call, and let DATA LINK introduce you to New England.

Our list of client companies is endless, and all fees, interviews and relocation expenses are paid by our clients.

DATA LINK
National Recruiting Consultants
Exeter Professional Building
Hampton Road, Exeter, NH 03833
(603) 772-5400

Expansion position in the Southeast Sunbelt. Our top quality client companies have immediate needs for the following:

Prog Anal with COBOL, CICS
PAs with 2+ years IMS DB/DC
PAs to Proj Leaders with banking and/or insurance package experience
Syst Prog - OS/MVS (XA is a plus)
PAs & SAs with DEC background in inventory applications

All companies offer paid rels, excellent benefits, good growth potential. Send confidential resume to:

MANAGEMENT RECRUITERS OF ST. PETERSBURG
Attn: CWB
7891 49th Street North
Suite 207
St. Petersburg, FL 33762
(813) 577-2116

Give us your resume

We'll give YOU Silicon Valley!

You've heard about the legendary companies here. If you've thought of joining one of them, let us help you make the connection. We've been here since the legends started, and know the right people in the right places.

So send us your resume today, or call; perhaps this will be the start of your own legend! All fees are paid by our clients, many of whom will also assume interview and relocation expenses.

Computer Resources Group, Inc., CRG
3080 Olcott St., Santa Clara, CA 95054, (408) 727-3488, or
303 Sacramento St., San Francisco, CA 94111, (415) 398-3535

CRG AFFILIATES IN 27 MAJOR U.S. CITIES

An employer-retained professional placement service

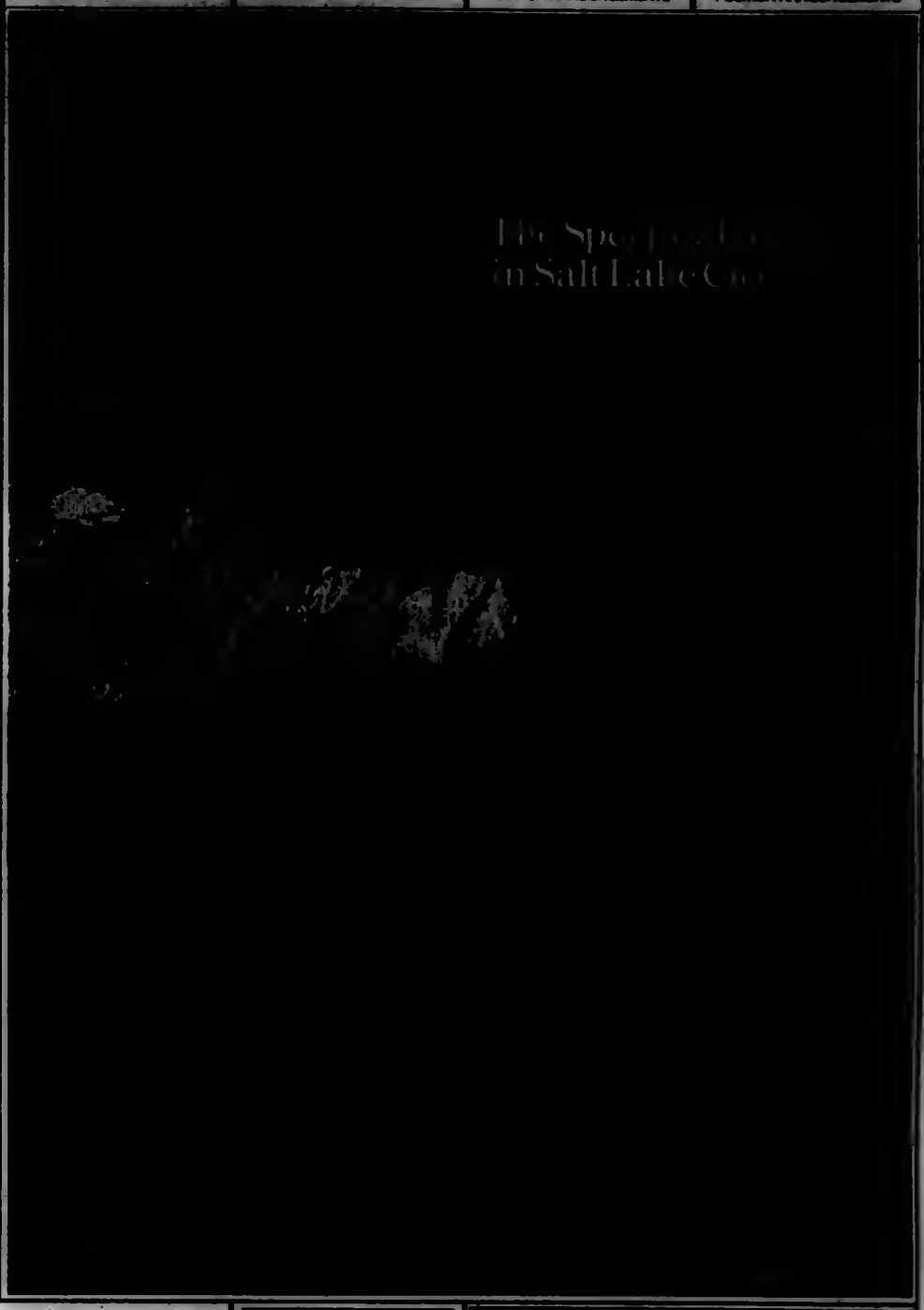
POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

APPLICATION ENGINEER

To insure administrative control and provide engineering support for 16 laboratory computers (IBM PC/XTs) and their software under MIT's Project Athena. Will serve as liaison between the laboratory and Athena headquarters. Will assist users (staff and students with many fields of interest) with their data analysis and in solving a variety of software problems. Assist users with machines including design of new connector panels and arrangements for outside firms to manufacture these. Determine need for computer repair and arrange for same. Implement new software and report "bugs" to developers (usually faculty supervisors). Assist developers as needed. May participate in development of new software and in identification of alternative hardware.

Applicants should have BA or equivalent experience; some experience writing computer software and some hardware familiarity, preferably with IBM PCs. Organizational and managerial skills preferred as well as ability to relate well to users with differing needs and skill levels.

Send 2 copies of resumé ATTN: A85-305 to: MIT Personnel Office, 77 Massachusetts Ave., Cambridge, MA 02139. MIT is an equal opportunity/affirmative action employer.



SUNBELT CAREERS

SYSTEMS DEVELOPMENT

Prog./Analysts: IBM, HP, DEC ..... To $35K
Systems Analysts: Financial ..... To $40K
Project Leaders: IBM or IBMS ..... To $45K
Corporate Systems Director ..... To $70K

TECHNICAL SUPPORT

Systems Progs: IBM or MVS ..... To $40K
Communications Network Spec ..... To $40K
DEC VAX Systems Engineers ..... To $40K
Technical Support Manager ..... To $50K

This is a partial listing. Client companies pay all employment costs, including relocation. Call C. Hankins at (704) 375-8888 or send resume to:

212 S. Tryon Street
Suite 1350
Charlotte, NC 28281

FOX-MORRIS

- GULFCOAST CAREERS - EDP PROFESSIONALS

- Mgr - System 38, 36/38, RPG/400, Mfg
- Mgr - System 38, 36/38, RPG/400, Port
- PPA - Data Base/400, Medical
- Prog. - 36/38, RPG II, I or, etc., Mfg
- SA - PRIME, Pascal, etc.
- PPA - Burroughs, Cobol, Mfg
- SPA - Burroughs, Cobol, Bank, appl.
- PPA - Burroughs, Cobol 74 or 68, Port
- Sr. A - IDMS, VAX Cobol, Port
- PLL - IDMS, VAX Cobol, Port
- PPA IDMS VAX Cobol, Port
- SPA IBM MIF, CICS/VSE Real
- SPP IBM MIF CICS VSE
- PPA IBM MIF DOS/VSE I/O
- Prog. IBM MIF DOS/VSE I/O

• Growth Opportunities awaiting YOU! • Interviews, Fees & Relos. Paid

BASON'S, EDP DIVISION
601 N. Lobdell, Baton Rouge, La. 70806
(504) 387-7000

RPG III PROGRAMMER

Chicago based, expanding industry leader is seeking a programmer with 2+ years of RPG III experience. Good verbal communication skills required. Background in communication systems, marketing or insurance is a definite plus.

In exchange for your expertise and contribution, we offer a salary related to experience, bonus plan, company paid benefits and realistic and upward career paths. PRINCIPALS ONLY. Please submit resumes and salary requirements to:

RUSTY JONES, INC.
Manager - Information Services
Rusty Jones Tower
8300 N. Hiawatha Ave.
Chicago, Illinois 60648
Equal Opportunity Employer M/F/H

Average Temp - 72°
No State Income Tax

SUNSHINE STATE

Florida's EDP community is Booming!
Our clients need your expertise

ANALYSTS/PROGRAMMERS

PL1, Cobol w/IMS or CICS ..... To $36K
Data Security, RACF, ACF2 ..... To $40K
IDMS, POCUS, SAS or INFO ..... To $40K
Datacom, Ram Proc, MVS ..... To $35K
Sqlds, C, PC Software ..... To $40K

SOFTWARE/INTERNALS

MVS or VM, CICS or IMS ..... To $40K
Jr Sys Prog, UCC Support ..... To $35K
ACF/VTAM Sys Prog ..... To $35K
DBA's, IMS, ADABAS, Model 204 ... To $40K

Other Positions Available Throughout FL & SE

FOR ACHIEVERS ONLY

INTERMEDIATE to SENIOR LEVELS

- Software Development Mgr.
- Technical MIS Specialist
- Data Base Administration
- Voice/Data Communications
- Office Automation
- Lans C Unix
- Microprocessor Software
- Systems & Programming Mgr.
- EDP Audit/Security
- Systems Planning
- Manufacturing Systems
- PC Micros

BRUCE A. MONTVILLE
Managing Partner

EXETER 2000™
National Recruiting Consultants
(800) 558-6712

COMPUTER PARK, P.O. BOX 4979
MADISON, WI 53562

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

BUSINESS APPLICATIONS COMPUTER PROFESSIONALS

Bell Helicopter Textron Inc. has a history of success as the world leader in the helicopter industry. We have initiated a major expansion program to provide the computer support necessary to meet the challenges of future growth.

THE ENVIRONMENT:

Large scale IBM and IBM compatible computers. MVS, IMS, DB2, TSO, SAS, COBOL, PL/I and 4GL Application Generators.

You can play a major role in the development of integrated data base systems in the areas of Logistics Support, Inventory Cost Management, and the installation of state-of-the-art interactive systems in Human Resources Management.

THE OPPORTUNITIES:

SYSTEMS ANALYSTS with background in design, development, implementation and maintenance of IMS data base systems. Two years analysis experience, preferably in manufacturing systems.

BUSINESS APPLICATION PROGRAMMERS/ ANALYSTS with two years COBOL experience in a large scale design and development environment. IMS experience desirable.

Candidates must have appropriate degrees and/or extensive related experience and a track record of success to qualify for the Bell team. If you do—consider our competitive salaries and top benefit package—and the environment for your personal growth. Send your letter of introduction or resume NOW in complete confidence to the address indicated below. Salary information should be included.

Bell Helicopter Textron Inc.
Employment Manager
Dept. 19-11
P.O. Box 482
Fort Worth, TX 76101

Bell Helicopter TEXTRON
A Subsidiary of Textron Inc.

an equal opportunity employer m/f

Data Processing Training Coordinator

Position with City Of Colorado Springs, Department, organizes, coordinates and directs the training activities of technical training programs within the data processing division. Bachelor's degree from accredited college in Computer Science, Business Administration, Education, Business Administration or related field. Three years of technical experience in the design and implementation of computer technical training or in the installation of programs for planning, organizing, and conducting computer education programs for data processing personnel or comparable combination of education and experience. Demonstrated experience with Sperry 1100 and/or IBM 4300 is an additional requirement. Salary: $24,648-$32,772 annually. Interviews Wednesday or Friday until April 5, 1985 from 8AM to 5PM at the City Of Colorado Springs, 30 South Wasatch, Suite 100. Refer to position # DP-36. A city application will be required on receipt of resume and the application must be returned by Friday, April 5, 1985 to City Of Colorado Springs, Department Of Personnel, Attention DP-36, P.O. Box 1575, Colorado Springs, Colorado 80901.

We are an Equal Opportunity Affirmative Action Employer

Richard P. Rita, a multi-office organization with 14 years experience in data processing placement, has outstanding opportunities for qualified individuals in large, IBM, state-of-the-art environments throughout the Southeast and Florida. We currently have openings for Programmers, Programmer/Analysts, Systems Analysts and Systems Programmers. These positions offer excellent compensation and benefit packages depending upon background and qualifications. Along with the outstanding Florida recreational lifestyle, there is no state income tax and a lower cost of living. All fees, interview and relocation expenses are paid by our client companies.

Now is the time to take advantage of the need for qualified data processing personnel in Florida. Contact:

Tony Weitz
RICHARD P. RITA, INC.
(813) 877-8765
4632 Bay Bend Blvd., Suite 108
Tampa, FL 33607

SYSTEMS PROGRAMMERS

FOR POSITIONS IN MA, PA, CA
FOR COMPUTER MANUFACTURERS

CICS Experience	to $37K
MVS/VTAM	to $42K
DECNET/Ethernet	to $45K
VAX/VMS Programmer	to $38K
WANGNET	to $48K
BURROUGHS Systems Experience	to $48K

ALSO

CAD/CAE in LSI	to $38K
LSI/CMOS Hardware	to $44K
CAE-Printed Wire Board	to $40K
NETWORK Arch-DEC/WANG	to $44K
VAX Systems Mgr	to $32K
Adv Data Comm Design	to $42K
Semi Custom LSI Design	to $42K
Data Ctr. Supp. Burroughs Sys.	to $38K
DEC 10 TOPS 10/20 Sup.	to $34K
MRP II Analyst - DBMS/COBOL	to $32K

BS/CS or BE Degree required minimum of one full year in a relevant position.

DRUID can assist you in making your career move. Send your resume in confidence to:

DRUID
TECHNICAL SERVICES
P.O. BOX 2687
S. BURLINGTON, VT 05401
(802)862-7782

NEW YORK

PROJECT DIRECTOR
$80,000

Midtown Manhattan textile company. Complete responsibility for the conversion of manual system to on-line system. You should have success in similar type of conversion prior.

EDP AUDIT
$45,000

2+ yrs exp (Public pkt) with CPA or CSA deg. Sr. level position with internationally known teaching hosp offering outstanding bnfts. COBOL-/PL1, EASYTRIEVE in IBM 4300/PC environment best.

CAPACITY PLANNING
$45,000

Huge banking conglomerate that is enjoying new latitude. Knl of capacity planning, storage evaluation, RMF, SMA. Unique position for proven specialist.

VTAM INTERNALS
$50,000

Multi-disciplined financial inst. Evaluate performance and resp large rewards. 308X, MVS/XA environment. Unreal perks

Call Joan Bernstein, Karen Lowry or Brian Walsh for more details.

ROBERT HALF OF NEW YORK, INC.
522 Fifth Avenue
New York, New York 10036
(212) 221-6580
Client Companies Assume All Fees

FLORIDA

COMPUTERPEOPLE, a national data processing placement and contract services company is expanding in Florida with a new Ft. Lauderdale Office. Our growth and the continued need for qualified data processing personnel in Florida combines for outstanding opportunities for you. We will provide a knowledgeable approach to your career planning because our Placement Counselors are former D.P. Managers. If you are a CONTRACT PROGRAMMER, SYSTEMS PROGRAMMER, PROGRAMMER/ANALYST, SYSTEMS ANALYST, or PROJECT LEADER with a background in one or more of the following, we may have the opportunity you've been seeking:

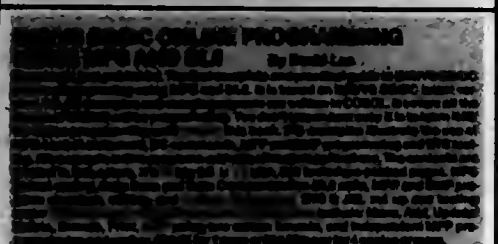
- IBM
- Honeywell
- HP 3000
- Burroughs
- IMS
- IDMS
- CICS
- COBOL
- PL/1
- OS
- DOS
- IMAGE
- VIEW
- IDS
- NDL

Our broad client base provides state-of-the-art work environments, excellent compensation and benefits and the recreational advantages of Florida locations. For immediate consideration, contact:

COMPUTERPEOPLE

5402 Beaumont Center
Suite 108
Tampa, FL 33614
(813) 886-8136

3000 W. Cypress Creek Rd.
Suite 3
Ft. Lauderdale, FL 33309
(305) 771-0660



CICS/VS COMMAND LEVEL PROGRAMMING WITH COBOL EXAMPLES

By David Lee

CICS OCEAN SYSTEMS DATA PROCESSING SERVICE
(714) 540-7042

ENGINEER

Senior Software Engineer

IntelliCorp, a rapidly growing leader in the field of artificial intelligence software, is seeking an experienced Senior Software Engineer.

This position involves assisting with VAX software, writing new systems software, maintaining utilities on our DEC-2060, monitoring and improving system performance and installing networking tools.

We require 2 years' experience with TOPS-20. Experience with LISP machines, VAX-VMS and PASCAL would be helpful and a 4 year college education is preferred.

Please send your resume and salary history to Personnel, Dept. SSE/CW, IntelliCorp, 707 Laurel Street, Menlo Park, CA 94025-3446.

IntelliCorp
Equal Opportunity Employer

NATIONAL OPPORTUNITIES
$20-50,000

Both business and/or scientific applications-programming, systems analysts, data base design, data communications, systems programming and management. Positions available nationwide with some of the top Fortune 500 companies.

Forward your credentials in confidence; also include your geographic preference.

EXECUTIVE RESOURCES
SERVING THE NATION FROM DAYTON SINCE 1959
SUITE 210 - 3077 KETTERING BLVD.
DAYTON, OHIO 45439

PROGRAMMER ANALYST ATLANTA

We are ARBY'S, the fast-track, internationally-recognized restaurant chain headquartered in Atlanta. If you are seeking a career where your performance is recognized and your abilities are challenged to their ultimate potential, then we have a place for you at ARBY'S.

Our current needs include a Programmer Analyst for our Atlanta headquarters. Qualifications include a strong background in COBOL and retail application. Point of sale experience is desirable.

The qualified candidate has the potential to move into a management position.

We offer qualified candidates an excellent salary and benefits package, plus excellent growth potential for those who excel. If you enjoy challenges and are achievement oriented, this could be the opportunity you've been waiting for. For immediate, confidential consideration, please send your resume including salary history in confidence to:

Attn: Human Resources Dept.
ARBY'S, INC.
Ten Piedmont Center
3495 Piedmont Rd., NE
Suite 700
Atlanta, GA 30305
E.O.E.

Arby's

EMERY

Manager, Application Systems

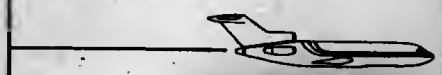
Emery's growth in applications development means more opportunity for you.

You already know Emery Worldwide, a leader in the multi-billion dollar air freight industry. Now find out about our sophisticated computerized accounting operation in Scranton and the impetus our expansion can give to your career.

In this highly visible position, you will oversee the development and coordination of our accounting systems, which are vital to our overall success. You'll direct a team of systems professionals working in a large scale IBM environment to provide support to our nationwide computer network.

Position requires a minimum of 10 years experience (3 of which should have been in a management position) in financial/accounting information systems and background in project management methodology. Familiarity with MVS, CICS and IDMS software is preferred along with a multi-faceted DP background. Supervisory experience in data processing and excellent verbal/written communications skills are also required. Bachelor's degree and experience in a large scale IBM environment is preferred.

We offer an excellent salary, comprehensive benefits and career growth potential. Please send your resume and current salary information in confidence to: Employee Relations Manager, Emery Worldwide, P.O. Box 1649, Scranton, PA 18501. We are an equal opportunity employer.



EMERY WORLDWIDE

Good News for SYSTEMS PROGRAMMERS

Make a major impact!

CPC International, a worldwide Fortune 100 corporation is seeking a highly qualified software specialist for the technical services staff at our conveniently located world headquarters in Northern New Jersey.

You will be responsible for configuring, maintaining and installing operating software for an IBM 3083. Your in-depth knowledge of software analysis and operating systems modules will allow you to tune and maintain the operating environment for maximum performance and reliability.

To qualify for this opportunity, you must have extensive experience with VM/SP or MVS/SP. Prior experience with VS1, CICS, VM/SP HPO or MVS/XA is desirable.

Learn about this excellent opportunity for professional growth and visibility, above average salaries, comprehensive benefits which include full relocation to delightful and affordable suburban New Jersey. The area offers excellent living and housing opportunities and is within easy reach of the metropolitan attractions of New York City.

Call Janet Tuffy collect (201) 894-2904 Mon. - Fri., 8 am - 5 pm EST in strictest confidence. Evening/weekend interviews can be arranged. Or send resume, to:

epe International

Headquarters Personnel Department
CPC International Inc.
P.O. Box 8000, International Plaza
Englewood Cliffs, NJ 07632
An equal opportunity employer M/F

Project Management/DP Consulting

The Boeing Challenge Comes in a Variety of Flavors

BOEING COMPUTER SERVICES is a world leader in information processing, providing integrated information services to more than 2,000 commercial customers and more government agencies than any other company. Because of our excellent reputation for quality work, technical support and dedication, we have immediate opportunities for highly qualified, highly motivated individuals who can meet the Boeing Challenge.

PROJECT MANAGEMENT

As a Boeing Project Manager, you will:

- Manage the systems development life cycle from requirements analysis through (and beyond) implementation
- Assist branch sales office teams in identifying and closing new professional services opportunities
- Direct Boeing, client and/or subcontractor staff
- Develop and maintain close, consultative relationships with clients

These positions require a minimum of 7-10 years data processing experience (including some experience as a team leader or project manager in a major systems development effort) and a thorough familiarity with large-scale IBM manufacturing, business and operating systems (MVS, TSO, CICS, etc.).

Undergraduate and Master's level degrees in Business Administration, Computer Science, Management Information Systems or equivalent combinations of education and experience also required.

SYSTEMS ANALYSIS/CONSULTING

As a Senior DP Consultant, you will:

- Perform project integration
- Achieve maximum utilization of resources
- Ensure timely, efficient completion of projects
- Help direct and design implementation of operating architectures
- Coordinate current and planned project schedules

You must be skilled in large-scale IMS development, system walk-through, quality assurance reviews, test procedures, change control, migration from test to production procedures, and hardware and software utilization. Project management experience and solid communications skills are essential, as is 5-7 years experience in systems analysis and customer interface.

Boeing offers highly competitive compensation, state-of-the-art technology and a commitment to excellence unmatched in the industry. Positions are available in Pittsburgh, Philadelphia, Chicago, Atlanta, the Washington, D.C. metro area, and other locations.

For consideration, send resume, salary history and location preference in confidence to:

Susan Feliciano
BOEING COMPUTER SERVICES
Dept. CW318
7980 Gallows Court
Vienna, VA 22180

An Equal Opportunity Employer.

BOEING COMPUTER SERVICES

A Division of The Boeing Company

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

PILOT LOOKING FOR CREW

TECHNICAL CUSTOMER SUPPORT

We're Pilot Executive Software, the market leader in a new class of software called Executive Information Systems, linking corporate mainframes and IBM PCs into one information network for top management.

If you're a talented technical customer support representative, here's your chance to be on the cutting edge of technology and to leverage your track record with an exciting new product.

Requirements include excellent communication skills and the ability to handle pre- and post-sales support assignments. Knowledge of 4GL and command languages important.

We have positions available in 1985 for:

Boston — Dallas
Chicago — Toronto
San Francisco

The Pilot management team are all seasoned veterans from Cullinet, McCormack and Dodge, General Electric, Computer Pictures, etc. We offer a competitive benefits package along with an excellent compensation plan.

For immediate consideration, write:

Maurice Giguere, V.P. Sales
Pilot Executive Software
40 Broad Street
Boston, MA 02109

PILOT EXECUTIVE SOFTWARE

Tracking and control for top management.

AN EQUAL OPPORTUNITY EMPLOYER

SALES

$100,000 Plus Earning Potential
Software & Consulting Services

INTEC SYSTEMS,INC. is a leading computer systems consulting company specializing in productivity improvement and cost containment programs. Our years of experience and numerous successful assignments have saved our clients millions of dollars and vastly improved their information systems activities.

Exceptional opportunities exist for experienced Sales Professionals with consulting and/or computer services sales background and demonstrated earnings of $50,000 to 70,000 plus annually.

To learn more about these unique opportunities, call John DaGrosa at (305) 832-3799 or send resume with sales and salary/commission history to: **INTEC SYSTEMS, INC., 400 Australian Avenue, West Palm Beach, FL 33401. (Formerly A.P.Telecomputing Corporation.)** An equal opportunity employer, m/f.

INTEC Systems, Inc.

VICE PRESIDENT FOR INFORMATION RESOURCE MANAGEMENT

Career opportunity at Cal. State Univ. L.A. for chief executive to plan and direct a comprehensive Information Resources Program for Management Systems Development, Institutional Studies & Info. Services, Data Processing & Network Ops., Telecommunications.

Standard is Bachelors degree with professional experience or equivalent degree plus 5 yrs. relevant applicable experience including professional experience in computer, business or management aspects of an Info Resources Mgmt. Program. Salary commensurate with credentials. Send resume with salary history by April 5, 1985 to:

CALIFORNIA STATE UNIVERSITY at L.A.
Attn: Alice J. Carter
Human Resources Personnel
5151 State University Dr.
Los Angeles, CA 90032

EOE/AA/Handicapped/Title IX Employer

SENIOR SYSTEMS ANALYSTS

Rapidly expanding organization in an emerging high-technology industry has several positions available for seasoned Senior Systems Analysts to assist users in documentation and definition of Corporate Systems. Ability to interface with all levels of management necessary. IBM mainframe experience preferred. 4+ years experience in MIS; BS Degree required; MBA a big plus! Excellent visibility, benefits, and opportunity for advancement, with an industry leader! Salary to $45,000. Ready Pass or Warrior Software

BOATMEN'S BANK OF ST. LOUIS
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1400

SAN FRANCISCO

We are a retained search firm covering Ms. Cal. including Sacramento & Santa Clara Valley (San Jose).

We specialize in exclusive assignments for client companies who are stable, growing, profitable firms with long term career opportunities in state of the art environments.

We need data processing professionals from intermediate through management levels in these areas:

- Programmer/Analysts
- Data Base Analysts
- Systems Programmers

For these and other positions, send resume with current salary and/or call:

chuck klein
3684 ridgewood road
atlanta, ga. 30327

Applications are invited for a tenure-track position in the Computer Science Department starting September 1985. A Ph.D. in Computer Science or a closely related discipline with graduate training in Computer Science is required. The Department offers a strong undergraduate degree in Computer Science with 5 full-time faculty members. Particular interests of the Department include computer graphics, programming languages, and micro processors. To support the research, the department has a Software Lab which contains 2 Prime 9955 together with extensive system software and language compilers including Pascal, C, and Ada, a Graphics Lab which consists of a Graphicon 69 vector graphics workstation and IBM PC units with GKS software, and a Hardware Lab for circuit analysis and design. Utilizing the Motorola 68000 Microprocessor and interfaces are encouraged to apply. Send resume to: Gene Bell, Chairman, Computer Science Department, Mercer University, Macon, GA 31207.

Mercer University is an Affirmative Action/Equal Opportunity Employer.

FREE RESUME SERVICE

Even though we are a recruiting firm, we do offer a free resume service. Write or call for a resume preparation form. Complete the form and mail to us and we will return a completed resume to you. This is a confidential service with no obligation.

Call 919-378-1261
Adkins and Associates, Limited
P.O. Box 16062
Greensboro, NC 27406

TEXAS

Our function is to represent the TEXAS area to you and our client companies allow us to do our job. We can help you move to TEXAS if you are experienced in the data processing field. Affiliate offices throughout TEXAS.

2720 Stemmons Frwy., 12017
Dallas, TX 75207 (214) 637-4369

DATA PROCESSING CAREERS

SOFTWARE SUPPORT ANALYSTS

As a leader in transaction processing networks, ACI continues to expand and grow. The on-going need for career oriented DP professionals to join our staff is critical to our success. If you desire to become part of state-of-the-art technology in a growth oriented industry, our opportunities for Software Support Analysts may be for you.

These positions require either:

- 3-5 years programming experience in financial or EFT applications;
  Or
- 2 or more years practical experience in EFT or banking applications;
  Or
- 2 or more years Tandem operations experience;
  Or
- systems support experience with hardware or software vendor.

Strong communications skills are also essential, along with a desire to interact with customers and travel 25%-50%. Some international travel is possible. Duties and responsibilities will revolve around customer service and support.

In return for your expertise, ACI offers high visibility along with competitive salary, a flexible working environment and complete benefits package including an Employee Stock Ownership plan and 401K retirement plan.

For consideration, please send your resume and salary expectations in confidence to:

HUMAN RESOURCES DEPT. - SA

applied communications, inc.™
999 South 108th Ave.
Omaha, NE 68154
An Equal Opportunity Employer

FLORIDA

HEALTH CARE

The Jarvis Walker Group is presently recruiting for certain clients in central Florida with openings for individuals with experience in the health care industry.

The positions available include programmer analysts, hardware/software analysts, systems analysts, project leaders and management consultants. Initial tasks will involve applications development, providing hardware and software technical support, as well as working with clients to solve business/systems problems. Experience with IBM hardware and software is preferred, but other hardware will be considered.

Salaries on these positions range from $25,000 to $42,000, and some relocation assistance is available. If you would like information on any of these career opportunities or have an interest in the Florida marketplace, please call or send resume/letter to:

JARVIS-WALKER

4919 Memorial Highway
Tampa, Florida 33614
(813) 884-4448

Hardware, software, problems, people, pricing, ethics, litigation, communication, macros, minis and micros.

We like to make an issue of it. EVERY WEEK.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

NOW HIRING!

Client Companies in the Southeast, CO, and AZ are now hiring qualified professionals for their State-of-the-Art data centers. If you're considering a move, you owe it to yourself to inquire. All fees paid. Here's a sample of what the outlook has to offer:

Banking/Insurance

CICS sys prog.....to $40k
Mgr, loans.....to $40k
P/A's, macro CICS...to $32k
P/A's, CICS or IMS ..to $30k

Manufacturing

S/A's, IDMS .....to $37k
Sys Prog, VM or MVS .....to $47k
P/A's, COBOL, CICSto $34k

Call (904) 725-0667
or send resume to:
Kelly Davidson/Bill Denny
ADVANCED RECRUITERS
P. O. BOX 17489
JACKSONVILLE,
FL 32245-7489

INFORMATION ANALYST/DESIGNER

Opening for Information Analyst/Designer to design and develop computer based Management Information Systems utilizing Fourth Generation Computer Software and Languages for business applications in support of Corporate Accounting and Marketing units of warranty, inventory control, data development, installation, documentation and related activities; and assist in operation of Information Center by providing post-implementation user support, establishment and implementation of user training in Fourth Generation Computer Languages, and coordinating software upgrading to current levels of technology in Fourth Generation Computer Languages. Position is with manufacturer of food products situated in Battle Creek, Michigan. Qualified applicants must have MBA degree with major in Management Information Systems, or must have M.S. degree in Management Information Systems with graduate school courses in Corporate Accounting, Market Research and Econometrics (one course required in each). Applicants must also submit one Management Information System graduate school project involving Fourth Generation Computer Software and Languages. Starting salary $27,040 per year plus company benefit plan for 40 hour week. Send resume, transcripts showing required coursework, and graduate school project to:

7310 Woodward Avenue, Room 415
Detroit, Michigan 48202
Refer to Reference No. 7085
An Employer Paid Ad

SYSTEM CONSULTANTS
– SAN FRANCISCO BAY AREA –
These positions can bring Large Rewards, High Satisfaction, Major Challenges & Tremendous Growth.
SKILLS REQUIRED INCLUDE:
IMS, IDMS, CICS, COBOL, ALC, JCL with Mainframes, Minis and Micros.
LOGICAL OPTIONS
Personnel Agency Est. 1972
Bee-Rerbal Plaza, Space Tower, Suite #2014A
San Francisco, CA 94105 • (415) 777-3888

For data processing brain-power think of EDPeople, a service of Robert Half.

Intelligent machines need intelligent people.
And Robert Half has been finding these people
since the computer revolution began.

We know the job market,
and we know the right people
to meet your EDP requirements.

Call any of Robert Half's 80 offices
in the United States, Canada and Great Britain.
We'd like to help you hire smart.

ROBERT HALF®
EDP and financial personnel specialists.

OUR CLIENTS
are the leading NATIONAL and INTERNATIONAL corporations with major DATA PROCESSING CENTERS in NC, SC, So. VA, No. GA. They offer state of the art TECHNOLOGY, excellent WORKING CONDITIONS, outstanding FRINGE BENEFITS and nationally COMPETITIVE SALARIES.

WE ARE PROFESSIONAL RECRUITERS
We are paid by our company clients to assist them in identifying the talent required for their continuing growth. Your presentation to a potential employer is personal and confidential. Our clients pay all interview and relocation expenses.

SYSTEMS PROGRAMMERS 40K to 45K
Min. 2 yrs MVS-XA generation maintenance and tuning. Strong Assembler language background.

SYSTEMS PROGRAMMERS 35K to 40K
Min. 2 yrs MVS-SP generation maintenance and tuning. Strong Assembler language background.

SYSTEMS PROGRAMMERS 35K to 40K
Min. 2 yrs. VTAM/NCP generation, maintenance and tuning. Strong Assembler language background is desirable. Some DASD/LC communications software support.

SYSTEMS PROGRAMMERS 35K to 40K
Min. 2 yrs. CICS generation, maintenance and tuning in OS/MVS environment.

SYSTEMS PROGRAMMERS 40K to 45K
Min. 2 yrs. IMS DBCC generation, maintenance and tuning in OS/MVS environment. Assembler

DATA BASE ANALYST 35K to 40K
Min. 2 yrs. IDMS, ADS/O/L exp. physical data base design, utilities, tuning.

APPLICATIONS CONSULTANT 40K to 45K
Serve as advisor in applications development staff on technical capabilities, limitations and problem resolution exposed by DASD/LC network in MVS/XA, 4Mb, DBCC, ACF/VTAM, VTAM/NCP distributed (SNA based) and PDP 11/70 network environment.

PROJECT LEADER 35K to 40K
Min. 2 yrs exp. Must have Proj. Mgt. exp. with large scale MF. Sys. development in large mainframe OS/MVS environment. Order entry, Order processing, MRP, Production Planning systems desirable. Good methodology exp. a plus.

ANALYST/PROGRAMMERS 40K to 45K
Min. 4 yrs. Command Level COCL VS/AM, COBOL, OS-JCL. Any State Base exp. a plus.

ANALYST/PROGRAMMERS 30K to 35K
Min. 4 yrs. 40K DB/DC, COBOL, OS-JCL, 4 yr college degree a plus.

WE PRACTICE AFFIRMATIVE ACTION
Call 1-800-438-1054 (in N.C. 919-378-0804) or write (please include current resume, salary history, career, salary & geographic objectives). U.S. Citizens or Permanent Residents only.

STO FOX
personnel consultants • P.O. BOX 26888 • GREENSBORO, N.C. 27420-6888

EDUCATIONAL PUBLISHING

South-Western Publishing Co. is a leading developer of business related educational courseware for secondary and post-secondary institutions. We currently have an immediate opening for an Electronic Publishing Editor. As a member of the job incumbent: (1) planning prior to the development and preparation of manuscript and software; (2) administrative editing in preparing from first-draft manuscript and software to final draft; (3) coordinating the basic for the production of courseware with Staff Designers, Photo Researchers, Production Units and Quality Control Assistants; (4) participating in the writing and selection of authors; (5) participation in developing and evaluating new products; and (6) engaging in professional activities.

Minimum qualifications include: five years teaching experience at either the secondary or post-secondary levels (preferably in computer science, information systems or computer related subjects), and a Masters degree (preferably in computer science, information systems or MBA). Related publishing experience pertaining to this position would be considered in lieu of teaching experience. Programming knowledge using the BASIC language highly desirable.

For immediate consideration, please forward your resume, including salary history and requirements to:

South-Western Publishing Co.
Suite H, Elsevier
V.P., Director of Electronic Publishing
5101 Madison Road
Cincinnati, OH 45227

Equal Opportunity Employer M/F/H

MIS PROFESSIONALS

Halbrecht & Co. has been retained by a leading East Coast client in the Delmarva Peninsula seeking MIS professionals to provide support to their corporate and external plant facilities. Position openings exist in key functional areas to include:

Information Center Group

Positions range from Information Center Support Analyst up through Supervisor providing internal consulting to end-users in both mainframe and the PC areas. Knowledge of large IBM mainframes, PC's and their associated software products, i.e. FOCUS, RAMIS, APL/DL, ADRS II, VM/CMS, LOTUS 123, multiplan, etc. a desired.

Corporate Systems Group

Positions range from Programmer up through Project Managers supporting internal applications (finance/accounting, purchasing, sales/marketing, inventory, order entry). Responsibilities will include the design, development and implementation of new systems as well as support and upgrade of existing systems. Experience in OS/MVS, CICS, and structured design techniques highly desired.

Plant Systems Group

Positions are available for a Project Leader and Manager supporting external plant locations. Experience in a process control environment and knowledge of factory automation, MRP, shop floor control, time & attendance, etc. highly desirable.

The above positions are based at the corporate headquarters of this highly successful and growth-oriented company. Due to their commitment to MIS and continued expansion, the advancement opportunities offered are unlimited. For interviews, contact (703) 285-8888 or forward resume to: Tess Mallay, Halbrecht & Co., 19195 Main Street, Suite L, Reston, VA 22091.

HALBRECHT & Company

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

INTERNATIONAL AIR TRANSPORT ASSOCIATION

MANAGER INDUSTRY AUTOMATION

IATA

IATA's automation division is looking for an Industry Automation Manager to join a small dynamic team of airline automation experts based in Geneva, Switzerland.

The successful candidate will be required to manage automation related projects through all stages of development.

Applicants should have the following qualifications:

- at least five (5) years project management experience.
- knowledge of commercial aspects of aviation (airline industry experience would be an advantage)
- experience with the development of user and functional specifications.
- in-depth knowledge of automation technology.
- self motivation
- fluency in English
- willingness and ability to travel extensively.

Salary will be commensurate with experience with a maximum of SFR 85 000 net and relocation expenses will be paid.

Applications, including curriculum vitae, should be sent to:

Supervisor Personnel
International Air Transport Association
P.O. Box 160
1216 Cointrin-Geneva
Switzerland

to arrive no later than Friday 5 April 1985. Interviews will take place in the U.S.A. on 16-17 April 1985.

COMPUTER PROFESSIONALS

Babcock & Wilcox, one of the nation's leaders in energy-related technology, seeks solidly experienced computer professionals to fill immediate openings at its' Research and Development Division.

GROUP SUPERVISOR

Will direct the planning, cost justifying, implementation and operations of the computer equipment supporting the scientific/engineering user base for the Research Center. Will also supervise the planning and implementation of voice and data communication systems. Previous communications and VAX computer experience is required. A BS in Computer Science is required, and an MS is desired, along with 8-10 years or applicable work experience.

COMMUNICATION SYSTEMS ENGINEERS

Provides planning, analysis and support in our data communications environment; makes hardware and software evaluations and recommendations for our voice and data communication systems. 3-5 years of applicable work experience, and a B.S. in electrical engineering or computer science is required.

Salary and benefits are excellent, as is the potential for career advancement. For confidential consideration, please send resume to James Craft, Employment Coordinator, Babcock & Wilcox, Alliance Research Center, 1562 Beeson Street, Alliance, Ohio 44601.

An Equal Opportunity Employer

Babcock & Wilcox
Research & Development
a McDermott company

SysTec Inc.

SysTec is a nationwide service company with headquarters in Florida.

There are now excellent opportunities for Senior F.E.'s and technical specialists in IBM, AMDAHL mainframes and IBM and all plug compatible peripherals including STC, Memorex, Telex, etc.

SysTec provides a unique growth environment for capable and ambitious individuals.

In addition to excellent salaries, benefits include 100% medical and dental for employees and dependents, life insurance, disability, ESOP, and 401K plans.

Opportunities in the following cities immediately:

- Greater Washington, D.C. area
- St. Louis, Missouri
- Columbus, Ohio
- Detroit, Michigan
- Richmond, Virginia
- Positions in other cities available soon

Send resumes to:

Mr. Ben Randolph, V.P.
SysTec, Inc.
6694 Fleet Drive
Alexandria, VA 22310
OR
Call (800) 327-2202

FACULTY POSITION IN BUSINESS COMPUTER INFORMATION SYSTEMS

The Computer Information Systems Department welcomes applications for faculty position available Sept. 3, 1985. Masters in Business preferred (will consider Bachelors degree with extensive business and teaching experience.) Several years of recent experience in business systems analysis and programming is required. College teaching experience desirable. Persons having interest in undergraduate instruction and ability to teach courses in several of the following areas: Systems Analysis, Programming Languages, Teleprocessing, and Data Base Management. Rank and salary will depend upon qualifications and experience. Send complete resume to:

Dr. Stuart J. Travis
Head, Computer Information Systems
Ferris State College
Big Rapids, MI 49307

AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER

SENIOR CONSULTANT TO $60,000

Prestigious regional consulting firm seeks a degreed, aggressive professional to handle a start-up opportunity with mini/micro clients. Requires 4 + years with a CPA firm in a consulting environment. Will grow into a management position with hiring responsibilities. Good communication skills and technical proficiency are also required. Call Mark David or Tim Smith at (612) 339-9001 on Job # 7077.

ROBERT HALF
3636 IDS Center
Minneapolis, MN 55402

WISCONSIN

Quality living for you and your family in Wisconsin. Trees, lakes, fresh air and a pace that allows you to enjoy them.

Wisconsin companies are many and excellent, offering professional positions of every kind at competitive salaries. My 15 years of experience gives you the best possible exposure, yet utmost confidentiality.

LEOTA ESTER EMPLOYMENT SPECIALIST, INC.
Landmark Square, Suite 140
200 E. Washington Street
Appleton, WI 54911
Ph. 1-414-731-2528

[redacted]

Southeastern Locations to $50,000

If you have one year or more of System-38 experience, and if I have not called YOU, no one has told me about you yet, so...PLEASE...

CALL ME!!
Jim Lee
Collect 919-584-5591

or send resume in confidence to:

PERSONNEL PLACEMENT, INC.
P.O. BOX 1616
BURLINGTON, NC 27216-1616

Fees and Relocation paid by our client companies. Top clients now interviewing for positions "SUNNY" NC, SC, VA, GA, TN, FL, LA, AL.

PROGRAMMING MANAGER

Memorial Hospital of Hollywood has an opportunity for a Systems Professional to enter the ground floor of a major expansion program in computer services. The successful individual would report to the Director of Computer Information Systems and be responsible for management of technical in-house staff. This newly created position requires an extensive background in an IBM computer environment, DOS/VSE, CICS and Project Management skills. Hospital experience strongly preferred.

In return we offer a competitive salary and benefits package including 30 paid leave days annually; Medical, life and dental insurance; Tuition allowance and fully paid pension plans and tax shelter annuity program. For further information, contact Linda Wisniewski, Employment Manager.

Memorial Hospital
3501 Johnson Street
Hollywood, Florida 33021
(305) 985-5872

An Equal Opportunity Employer

ACT PROGRAMMER/ANALYST
ACT INFORMATION SYSTEMS DIVISION

Immediate opportunity for computer systems professional in Iowa City offices of the American College Testing Program (ACT). Emphasis on systems analysis and design of data base systems in micro and multiprocessor environment. Duties involve internal consulting and data management/processing. Knowledge of UNIX and/or C language desired.

Normal starting salary $1,650 per month, plus exceptional benefit program and excellent work environment. To apply, submit letter of application and resume to: Personnel Services, ACT National Office, P.O. Box 168, Iowa City, Iowa 52243. Application deadline is April 8, 1985.

ACT is an Equal Opportunity/Affirmative Action Employer

Just A Reminder!

National Computer Graphics

Computerworld will be distributing the April 8, 1985 issue from our booth. In order to take advantage of this increased distribution

Reserve space Now

Classified Advertising Deadline is Friday, March 29th

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

617-879-0700 1-800-343-6474

The Mind to Imagine
THE SKILL TO DO

Motorola's Government Electronics Group — a world leader in electronics, renowned for quality and productivity through employee participation in management — has the following opportunities for data processing professionals.

Senior Programmer/Analysts

Requires excellent organizational, analytical and supervisory skills with experience on large IBM hardware utilizing COBOL, TSO/SPF, OS/UTILITIES and IMS DB/DC. Prefer degree with 3 years experience.

Maintenance Programmer/Analysts

Opportunities for qualified candidates to support and maintain production systems. Requires extensive experience on large IBM hardware utilizing COBOL, TSO/SPF and utilities with emphasis on financial and/or manufacturing systems. Prefer technical degree.

MIS Systems Manager

Responsible for planning, organizing and controlling the activities of the MIS Production Systems Group which includes implementing newly developed systems, implementing user training and managing documentation and reducing maintenance hours. Must have excellent organizational and communication skills to meet with all levels of user management. Prefer BS degree and 7 years experience (2 years as Maintenance Manager) with COBOL, IMS, OS/MVS on 308X IBM computers.

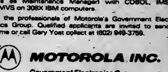
Join the professionals of Motorola's Government Electronics Group. Qualified applicants are invited to send resume or call Gary Yost collect at (602) 949-3759.

MOTOROLA INC.

Government Electronics Group

8201 E. McDowell Rd., Dept. B288
Scottsdale, AZ 85252

An Equal Opportunity/Affirmative Action Employer
U.S. Citizenship Required



GROUP HEAD DATA COMMUNICATIONS

NCAR has an immediate opening for a senior level programmer to manage a group of 2–4 programmers involved in supporting data communications activities and facilitating access to our computer resources for the user base of our Scientific Computing Division. Coordinates the planning, development, enhancement and acquisition of software/hardware systems to provide and/or improve user friendly interactive and remote batch access capabilities. Provides expert user assistance/consulting on computer communications and access, contributing to the training of users through coordinating/participating in classes, lectures, seminars and site visits.

REQUIRES: MS in computer science, math, engineering, physical science or the equivalent combination of education/experience; expert knowledge of communications methods, hardware, software, technology and services available; skill in data communications and remote access; expert knowledge of various communications protocols (asynchronous TTY [IBM] binary synchronous 2780, 3780, 3270, HASP, [CDC], synchronous UT200 and X.25); advanced knowledge of computer networking (LANs, packet switched networks, high speed area networks) and of a variety of computer operating systems; skill in managing/coordinating a technical staff and team projects; strong communication skills; skill in structured design; skill in planning for software development for a diverse user group within budget.

DESIRED BUT NOT REQUIRED: Skill in FORTRAN and C programming; familiarity with IBM EXEC2, UNIX operating system, VM/CMS operating system and RSCS communications subsystems; experience in high bandwidth communications systems using satellite links.

SALARY: $35,300–$53,000/year. NCAR offers an excellent fringe benefits package including relocation assistance.

PROCEDURE: Send resume, letter of interest and list of 3 references to N. Lippincott, NCAR, P.O. Box 3000, Boulder, CO 80307 or call (303) 497-8707 for application.

An Equal Employment Opportunity/Affirmative Action Employer

NCAR
National Center for Atmospheric Research

Never underestimate the power of paper-based communications.

It's tough to find something to equal the punch that strong graphic communications deliver. At Compugraphic, we've picked up the challenge of applying advanced technology to the development of state-of-the-art systems and products for the graphic communications industry.

At Compugraphic, we're changing the course of graphic communications — exploring new and exciting directions. We're utilizing systems incorporating the newest microprocessors, local area networks, UNIX™ and other real-time operating systems, image control systems, lasers, bit-map raster graphics and sophisticated text software.

Our Computer-Aided Page Design systems provide letterfitting and page layout or total "pagination," while our newest Personal Composition System allows graphic designers to merge text with visuals — and immediately realise concepts within their imagination.

Right now, we're investing heavily in research and development, utilizing the most advanced technology to build sophisticated new systems to meet the needs of our evolving market. If you're an engineering professional, join Compugraphic. And be one of the heavyweights in the graphic communications arena.

Compugraphic is located off Route 128, "America's High Technology Highway," just 20 minutes from all the educational and cultural resources of Boston and close enough to the many recreational opportunities of New England's beautiful mountains and beaches.

TECHNOLOGY LABORATORIES

Several key design/evaluation positions exist within our Engineering Technology Laboratories responsible for investigating and developing new technologies in products design and introduction.

Senior Software Engineers

- Develop and maintain language tools and utilities for efficient Compugraphic software development efforts
- Work on UNIX™, VMS, MS-DOS, CP/M and MENTOR operating systems.
- Positions require 2-4 years language tools experience working with cross assemblers, operating systems and/or compilers.

UNIX™ is a registered trademark of AT&T Bell Laboratories

Section Manager
Data Communications

- Manage a small group in hardware and software development efforts
- Responsible for technical project management
- BSEE/CS with thorough knowledge of ASYN, SDLC, LAN and higher level Protocols.

For the above positions in Technology Laboratories, please send resumes to Harry Anderson.

Software
Tools/Release/Librarian

This is a lead software design and development position for our new Sun Microsystems-based technical publishing product. Responsibilities and qualifications include:

- Programming UNIX™/4.2 tools/utilities to support source code librarian efforts and customer release/configurations
- BSCS and 2+ years' software experience with:
- SCCS
- System release and configuration
- UNIX™ systems administration, tools and utilities
- Software manufacturing/distribution

For the above position in Technology Laboratories, please send resumes to Cheryl Perkins.

NEW PRODUCT DEVELOPMENT
Project Leader

This opening is on the exciting new SUN™ Work Station effort. We see lots of opportunity here.

- Lead style and structure guide project
- User interface/text/graphics/editor design experience a.k.
- B.S. degree and at least 4 years' experience.

For the above position in New Product Development, please send resumes to Dave Stevens.

Principal/Senior Software Engineers

Several senior positions available. You should possess the following skills and capabilities:

- Micro-based software development
- Graphics/text software background
- Familiarity with Assembly, "C" or Pascal
- Real-Time systems
- Device Drivers, systems supervisors and file systems

For the above positions in New Product Development, please send resumes to Joe Hart.

compugraphic®
Creating the Future of Graphic Communications
200 Ballardvale Street, Wilmington,
MA 01887
An Equal Opportunity Employer. M/F

MAINE - N.H.

We have specialized in data processing professional placement in Maine & N.H. for a fifth of a century. If you qualify for positions in the $25-50,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

ROMAC.
477 Congress St.
Portland, Maine 04101
(207) 773-4749

Arizona/California/Texas/Colorado/Florida/Boston
SCIENTIFIC OR BUSINESS PROGRAMMERS

All fees and relocation paid. $25-45,000

If you have a BSEE, BSCS, BS in Mathematics or Physics or equivalent, we need you right now.

For Business: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/Data Base. All large scale installations.

For Scientific: experience in the computer, communications, semiconductor, or aerospace/defense industries.

Your name, resume, and present employer will not be given out without your permission.

For sincere personal service, please send a confidential resume to:
Ben Pullman (602) 274-8800
PULLMAN PERSONNEL
3030 North Central Ave., Suite 808, Phoenix, Arizona 85012

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

consulting systems programmers

philadelphia suburbs

If you are a dedicated Systems Programmer who seeks the next plateau in your career, you will find a world of challenge and growth on the Sperry team. Openings currently exist at our Worldwide Headquarters in Blue Bell, Pa. for top-flight professionals who will do systems design and programming in our 1100 Executive Systems Development Group whose charter it is to design and develop I/O systems software, peripheral software and central systems complex software.

If you have a BS degree in computer science or equivalent, with a minimum of 2 years experience using the EXEC Operating System, and are knowledgeable in the EXEC internals of I/O, peripheral software, system generation, PERCON/ symbionts systems booting and initialization or course scheduler, we would like to hear from you.

We offer a highly competitive salary and benefit program and outstanding career growth opportunities. Qualified candidates are invited to send their resumes including salary requirements to: Professional Staffing, Dept. CSP, Sperry Corporation, Information Systems Group, P.O. Box 500, MSE1-100, Blue Bell, PA 19424. An equal opportunity employer.

SPERRY

© Sperry Corporation 1985

SENIOR COMMUNICATIONS SYSTEMS SOFTWARE MANAGER

L.A. based, wholly-owned subsidiary of leading financial institution seeks bi-level exec. to head technical development of large-scale distributed processing network/electronic funds transfer system for 160 software professionals, 10-15 yrs. exp. in data communications systems architecture/design and on-line, real-time distributed processing load area networks. Salary commensurate w/exp. Send confidential resume to: Suite 310, 6041 Airport Blvd., L.A., CA 90045.

PROGRAMMER ANALYST TO $30,000

The marketing services division of a major Twin Cities corporation has an immediate opening for a professional with a minimum 3 years COBOL on a Honeywell DPS6 or DPS8. Experience with FORTRAN a plus. Call Mark David or Tim Smith at (612) 339-9001 on Job # 7108.

RESOURCE SERVICE
3626 IDS Center
Minneapolis, MN 55402

New England, Westchester & NY Metropolitan Area

Permanent and/or Independent Consulting

BFT, BANKING • FUNDS TRANSFER ON-LINE BROKERAGE • CHECK PROC.

IDMS, CICS, IMS, VAX-BASIC, BURROUGHS-DMS, ALGOL, COBOL, HONEYWELL COBOL Level 6, TPS-screen write, Level 6, DMIV, TP, MULTICS, PL1, SERIES 1 (Graphics)-RPS-EDIX or Assembler.

Openings of all levels in any of the above. Call Reggie Lyons, 212-307-0939 or submit resume to Interface Inc., 17 West 54 St. NY, NY 10019.

ACP Applications Analyst

Position requires two to three years of ACP Applications Programming experience using IBM 370 Assembler in a VM, CMS environment. Hotel/motel industry background preferred but not essential. Qualified candidates should submit resume and salary history to:

Days Inn Of America, Inc.
2751 Buford Highway
Atlanta, GA 30324
General Employment

SOUTHEAST
PROGRAMMER/ANALYSTS

Several positions open with leading companies for programmers with 2 plus years experience in CICS, DMS or IMS. Salaries range from $20,000 to $28,000.

SYSTEMS PROGRAMMER

Should have 2 plus years experience in generating, enhancing and maintaining software products in an MVS environment. Salary in low 40's.

EDP is our only business. Fees excellent by client companies. Mail confidential resume to call Jos Sawyer (803) 297-3570.

Sawyer Associated Systems
P.O. Box 5040
Greenville, SC 29606

S 3B

We specialize in placing IBM System 38 candidates. We work with employers throughout the U.S. who have 8/38 equipment. One of our clients is looking for a Systems Analyst. This company is a fortune 500 company utilizing both large IBM and 8/38 equipment. Job will require 30% travel to Europe. High salary, excellent benefits-travel compensation. All fees and expenses paid by the employer.

Resource Placement Group III
Contact Paul Martin
P.O. Box 83
Waterloo, IA 50704
(319) 232-6641

PROGRAMMER ANALYST

Los Alamos County, situated in the northern mountains of New Mexico providing excellent recreational opportunities, is seeking an energetic and creative individual to join a team developing state-of-the-art interactive real time computer graphics systems. Prefer person who has experience in designing and implementing such systems and a background in DEC including BASIC, RSX and DATATRIEVE. Position open until filled.

Send resume to: Personnel Department, Los Alamos County, P.O. Box 30, Los Alamos, NM 87544.

Equal Opportunity Employer M/F/H

SOFTWARE ENGINEER - will be member of a team responsible for the design and development of a replacement for present input system and data processor units of financial system services. Responsible for data base file maintenance of new system. Knowledge of architecture design and software development for fault tolerant systems required. M.S. in systems and computer engineering required.

39 hours/week, $30,000.00 annual salary. Send resume to: Connecticut State Job Service, 100 Arch Street, New Britain, Connecticut, 06051. Refer to Job Order No. 0894891.

PROGRAMMERS

AIRLINES - National company needs well motivated individuals with experience and knowledge of IMS and ACP for immediate positions throughout the world. Guaranteed increase over present salary in addition to unique benefit package. Send resume and salary requirements to:

NPTR - CW
P.O. Box 949
Bloomington, MN 55912
or call Operator #28 at
800-638-4708

EOE

Programming

INFORMATION CENTER ANALYST

Due to rapid expansion in our Management Information Systems area, Pizza Hut, Inc., a major division of PepsiCo, has an outstanding opportunity for an aggressive, career-minded individual to assume key responsibility in our Information Center based in Wichita, Kansas.

You'll provide on-going consulting and technical support for end user training programs. The successful candidate must possess excellent communication skills for training of all levels of personnel. Desired qualifications include a BS and/or MS in Business, Information Management, or Statistics.

Pizza Hut can offer you an excellent salary, benefits and relocation package as well as outstanding opportunities for advancement. If you are interested in joining the world's largest company owned Pizza restaurant chain, please submit resume including salary history to:

Pizza Hut.

Manager of Employment
PIZZA HUT, INC.
9111 E. Douglas
Wichita, KS 67201

Equal Opportunity Employer

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call to send resume to rough notes of objectives salary location restrictions education and experience (including computers models operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0595

From outside New Jersey, call toll-free 800-222-0183

RSVP SERVICES
Employment Agents for Computer Professionals

COMPUTER CENTER DIRECTOR

Experience in managing a computer center, familiarity with VAX/VMS systems, programming knowledge, BS degree. $25-35,000. Start July 1. Send letter, resume, three letters of reference by April 15, to: D. E. Van Tassel, VPAA, **MUSKINGUM COLLEGE**, New Concord, Ohio 43762. EOE

SOFTWARE CODERS

Computerware is currently looking for coders with 3-5 years experience with a structured language (ADVAL, PL/M, Pascal, C, ADA, etc.) and military specifications experience. Excellent long term contract assignments in the mid west with rates to $30/hr. For immediate consideration call and send resume to:

Computerware Services
12851 Hillcrest Rd.
Suite 209
Dallas, TX 75234
(214) 669-8991

If you are looking

to recruit computer professionals, your first step should be to advertise in COMPUTERWORLD Classifieds. Chances are, it will be the step needed.

We're the number 1 trade newspaper for the computer industry. It makes sense, then, that advertising in COMPUTERWORLD should be the first and most logical step to take when searching for quality computer industry professionals.

With exposure to over half a million readers, there are bound to be plenty of people who are looking for what you have to offer. This means a greater number of responses to your advertisement and a wider selection of candidates from which to choose. And you shouldn't have to look any further.

COMPUTERWORLD publishes every Monday with an ad deadline of 10 days prior to each issue date. You may send in copy to be pubset or camera-ready material (velox or negative) via the mail. We provide telecopier service and will also take ads over the phone.

Our mailing address is COMPUTERWORLD, Classified Advertising, 375 Cochituate Road, Box 880, Framingham, MA 01701. Or call for more information at 1-800-343-6474 or, in Massachusetts, (617) 879-0700.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

When are you going to stop throwing your money away?

It is entirely possible that you are being paid less than you're worth in today's market. So, unless you change that condition, you will indeed continue to throw money away. You see, EDP salaries have been rising dramatically for some time now. Your own income may not have kept pace with that trend. While money, admittedly, is not everything, it is most certainly a major career consideration.

Don't underestimate your value in today's market. You owe it to yourself and to your family to make sure your income is what it should be. The very least you can do is to check it out.

All of our NCA firms can provide you with precise information about current salary levels both locally and nationally. If it turns out that your income is high level you can contentedly remain at your present position. If your income is less than you're worth we can help you to change that.

Come in. Call. Or mail your resume to the NCA firm nearest to you. Confidentiality is assured. Company clients pay our fees, so there is no charge to you ever for all our specialized services.

ATLANTA: BAI Limited
3475 Lenox Road N.E. Suite 490-C
Live Oak Center,
Atlanta, Georgia 30326 (404) 231-4545

BOSTON: Robert Kleven and Co. Inc.
North Brook Park, Suite One, 181 Bedford Street
Lexington, Massachusetts 02173 (617) 861-1020

CHICAGO: Thos. Hirtz & Associates
150 N. Wacker Drive, Suite 1700
Chicago, Illinois 60606 (312) 977-1555

COLUMBUS: Michael Thomas, Inc.
65 E. Wilson Bridge Road, Suite 201
Worthington, Ohio 43085 (614) 846-0926

DALLAS: DataPro Personnel Consultants
12720 Hillcrest, Suite 520
Dallas, Texas 75230 (214) 661-8600

DENVER: Abacus Consultants, Inc.
1777 South Harrison, Suite 404
Denver, Colorado 80210 (303) 759-5064

DETROIT: Electronic Systems Personnel, Inc.
3000 Town Center, Suite 2580
Southfield, Michigan 48075 (313)353-5980

FLORIDA: Data Sciences Personnel, Inc.
P.O. Box 8577
Hollywood, Florida 33024 (305) 434-6312

HARTFORD: Compass, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105 (203) 549-4240

HOUSTON: Career Consultants, Inc.
2000 South Post Oak
Houston, Texas 77056 (713) 626-4100

INDIANAPOLIS: Career Consultants
107 N. Pennsylvania, Suite 404
Indianapolis, Indiana 46204 (317) 639-5601

KANSAS CITY: D. P. Career Associates
6405 Metcalf, Suite 302
Shawnee Mission, Kansas 66202 (913) 236-9266

LOS ANGELES: Superior Resources, Inc.
Personnel Service
6016 Fallbrook Avenue, Suite 200
Woodland Hills, California 91367 (818) 884-3000

MILWAUKEE: EDP Consultants, Inc.
7332 West State Street, Suite 3
Milwaukee, Wisconsin 53213 (414) 475-0077

MINNEAPOLIS: Electronic Systems Personnel
858 Twin City Federal Tower, 121 S. 8th St.
Minneapolis, Minnesota 55402 (612) 338-6714

NEW JERSEY: Systems Search
90 Millburn Avenue
Millburn, New Jersey 07041 (201) 761-4400

NEW YORK: Bistal Associates, Inc.
7 Dey Street, Suite 410
New York, New York 10007 (212) 227-7370

NEW YORK UPSTATE:
CPA Associates Personnel, Inc.
2530 James Street
Syracuse, New York 13206 (315) 463-5225

NORTH CAROLINA: DataMasters
Div. of TeleForce Inc., P.O. Box 6868
Greensboro, North Carolina 27405
(919) 373-1451

PHILADELPHIA: Systems Personnel, Inc.
115 West State Street
Media, Pennsylvania 19063 (215) 565-8660

PHOENIX: Professional Career Consultants
4725 N. Scottsdale Road, Suite 200
Scottsdale, Arizona 85251 (602) 274-6886

PITTSBURGH: Martell Liguore & O'Brien, Inc.
P.O. Box 836
Allison Park, Pennsylvania 15101 (412) 487-5153

SAN FRANCISCO: The Computer Resources Group Inc. Agency, 303 Sacramento Street
San Francisco, California 94111 (415) 398-3535

SEATTLE: Houser, Martin, Morris & Associates
1940 116th Avenue N.E.
Bellevue, Washington 98004 (206) 453-2700

National Computer Associates

Call the NCA firm nearest to you for Salary Survey and Relocation Information

EDP Placement Firms in Washington D.C., San Antonio and St. Louis can learn about the many advantages of being members of National Computer Associates by calling Elaine Stewart (315) 463-5225

NEW ENGLAND

BOSTON
SENIOR CONSULTANT

Prestigious regional consulting firm seeks tech astute pro w/ mgmt. potential. Prior client presentations, requirements definition, integrated mfg./fin'l. sys. & micro. software exp. necessary. Accelerate your career growth in this key role. $45,000.

BOSTON
BUSINESS ANALYST - Retail

One of this area's best known retail firms seeks a proven analyst to design fin'l., inv. & distrib. sys. Large IBM mainframe tech. Oppty. to work w/comp. execs. to evaluate long term solutions to bottom-line problems. $41,000.

BOSTON
SENIOR P/A

Nationally recognized SO, NH com. seeks talented pro. w/recent. of fin'l. apps. IBM OS, COBOL bkgrd. best as is MSA plsg. exp. Exceptional benefits, environ. & adv. oppty. Salary to $33,000.

HARTFORD
SENIOR PROG./ ANALYST

S/38 - Hi-tech mfg. co. has an immediate need for an indiv w/S/ 38, RPGIII & MAPICS exp. Excellent growth potential. Salary to $34,000.

HARTFORD
SOFTWARE ENGINEER

CT Fortune 100 firm seeks SE's w/degree & min. 3-8 yrs. exp. to join dynamic team w/exciting projs. Environ. incl.: CDC CYBER, IBM, AN UYK-7, M68000, MIL-STD 1750A, ADA, APSE, FORTRAN. Great relo. pkg. Salary to $40,000.

PROVIDENCE
DATA BASE ANALYST

Lge. IBM mainframe facility needs IMS DB exp. DL1 Batch & CICS skills desired. Work in tech. support on latest IMS DB releases. Strong data base design & installation exp. req. $33,000.

ROBERT HALF

EDP PERSONNEL SPECIALISTS
Contact the Manager of any office listed below.

160 Summer St., Boston, MA 02110
(617) 423-1300
111 Pearl St., Hartford, CT 06103
(203) 278-7170
800 Turks Head Bldg., Providence, RI 02903
(401) 274-6700

Client Companies Assume All Fees.

HERMANN CHAIR OF BUSINESS

Tulane School of Business, Millsaps University. We invite nominations and applications for this new, fully-endowed teaching position at the Professor or Associate Professor rank. This tenure-track position will be open to COMPUTER INFORMATION SYSTEMS. The appointment will be effective in August 1985.

Candidates for the Hermann Chair of Business must: (1) have an appropriate graduate degree, (2) have a commitment to outstanding teaching, and a commitment to share breadth and intellectual stimulation, (3) have a significant record of achievement in computer information systems and a strong interest in continuing these activities, (4) be willing to serve as a resource to colleagues and students, as well as to the business community through consultation and programs for executives.

The salary is highly competitive, and will be based on individual qualifications. The Hermann Endowment also provides for the Chair's continuing professional growth and activity. Within the Fund's terms, it is expected that: (a) out of current research support, student assistance and travel funds is available. Additionally, Millsaps provides university subsidized support for faculty scholarship and development.

The Tulane School of Business has 650 undergraduate majors and emphasizes superior teaching with high intellectual and professional standards. A small graduate program, it enjoys a growing national reputation, a stable enrollment of 1200, and a strong financial position.

A letter of application and/or vita should be sent to: R. A. Mendelson, Dean, Tulane School, Millsaps University, 1189 West Main, Decatur, IL 62522. Applications must be received by mid April.

An Equal Opportunity Employer.

IMMEDIATE OPPORTUNITIES

IMMEDIATE OPPORTUNITIES CURRENTLY exist for skilled DP professionals with the following skills:

SYSTEM 38 - Requires RPG III experience. Salaries $18-24K.

SYSTEMS PROGRAMMING - MVS, VM, and DOS specialists. Salaries $30-54K.

DATABASE SPECIALISTS - IDMS, IMS, ADABAS, MODEL 204, and DMS 1100 designers, programmers and DBA's needed. Salaries $30-50K.

REAL-TIME - Software engineers and systems programmers. Salaries $37-48K.

MIS PROGRAMMER ANALYSTS - COBOL and/or ALC opportunities for programmers and project leaders. Salaries $22-37K.

Positions are available in Northeast, Central and West locations.

For more information call Tom Arnold at (201) 568-0400 or send resume to:

J. Randall Associates
P.O. Box 1621
Rockville, MD 20850
Attn: Tom Arnold

"Good Old Beasley, he'll never quit this company. Of course if he does, I'm sunk . . ."

"I'm sunk."

The corporate world is full of Good Old Beasleys. The kind who leave when the leaving is good. And leave you in the lurch.

We specialize in placements in computer technology, corporate accounting, public accounting, finance and banking. And our staff comes from these fields. We have thousands of qualified professionals on file in our national system. And we can replace Beasley before his name becomes bad news.

ROMAC

Call your local ROMAC® office or call our corporate office, 800/341-0353 or 201/773-6387.

Albany, NY 518/463-6644	Charlotte, NC 704/333-3166	Ft. Lauderdale, FL 305/928-0811	Orlando, FL 305/843-0760	St. Louis, MO 314/231-6334
Arlington, VA/D.C. 703/525-5160	Cleveland, OH 216/771-4822	Hartford, CT 203/525-8037	Paramus, NJ 201/839-7292	Syracuse, NY 315/422-1331
Atlanta, GA 404/231-3535	Columbus, OH 614/221-7077	Houston, TX 713/227-7700	Philadelphia, PA 215/568-6810	Tampa, FL 813/228-4327
Bala Cynwyd, PA 215/667-7351	Cranston, RI 401/463-7600	Jacksonville, FL 904/358-6068	Portland, ME 207/773-4749	Wilmington, DE 302/658-5857
Baltimore, MD 301/625-0400	Dallas, TX 214/720-0050	Memphis, TN 901/523-0500	Portsmouth, NH 603/431-2768	Winston-Salem, NC 919/725-1933
Boston, MA 617/482-6616	Dayton, OH 513/461-1373	Minneapolis, MN 612/342-2233	Woodland, PA 804/644-0187	
Buffalo, NY 716/853-5203	Fairfield, CT 203/255-9149	Newton, MA 617/969-4810	Rochester, NY 716/232-4610	

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

DATA BASE SPECIALISTS

Southern California

Northrop Advanced Systems Division, dedicated to advancing technologies and resolving complex challenges to America's defense, has created new opportunities within our Computer Systems Department for Data Base Specialists.

These highly visible senior-level positions involve IMS DB/DC data base systems development for key technical and business organizations within our Pico Rivera Division. Our progressive team of talented computer professionals are performing data-related activities to develop an integrated data base environment.

Your technical background will qualify you for these immediate openings if it includes extensive experience with on-line and batch IMS DB/DC data base systems. Additional skills and experience in data base design methodology as well as logical data analysis and modeling is highly desirable.

Our Pico Rivera location is just seven miles from downtown Los Angeles in the heart of Southern California. And while Advanced Systems Division's modern facilities are an ideal setting for your professional growth and development, our exceptional climate and nearby beaches, mountains and deserts offer you unlimited opportunities for recreational, cultural and personal fulfillment.

The involvement, scope and dimension of these career pursuits are further heightened through some of the most tangible, comprehensive personal benefit arrangements available. Please send your resume to: Dave Calley, Computer Systems Employment Office, Dept. CW 574, P.O. Box 1138, Pico Rivera, CA 90660-0677.

PROOF OF U.S. CITIZENSHIP REQUIRED. Northrop is an Equal Opportunity Employer M/F/H/V.

We're within your reach.

NORTHROP

Advanced Systems Division
Aircraft Group

Software Contracts

- Fixed Price Work
- New Development
- Tech Sales Support
- Expenses Paid
- Top Dollar $35K-104K
- Up to $80/hr.
- Short & Long Term Assignments

ADABASE	DEC VAX	IDMS/ADSO
COMPLETE	FORTRAN	IMS
NATURAL	DBMS 32	CICS
DBII	ASK	IBM 36,38
MSA	MUMPS	NOMAD
MEDICAID	UNIX/C	JOVIAL

Call Today

the EXPERTS

6911 Richmond Hwy
Alexandria, VA 22306
(703) 765-5570

6401 Thunderbird Ave.
Lauderdale by The Sea, FL 33308
(305) 776-5570

System Developers

See-ze-plus

Scientific Placement, Inc.

POSITION ANNOUNCEMENTS

DEPARTMENT SUPERVISOR TO HI-530's

Put your skills to work in implementing a large scale manufacturing system. Requires 6-7 years total data processing experience with the last 3 in a supervisory capacity. Also requires large scale IBM experience in a manufacturing environment. Excellent benefits accompany this position. Call Mark David or Tim Smith at (612) 338-9001 on Job # 6079.

ROBERT HALF
3535 IDS Center
Minneapolis, MN 55402

SYSTEMS ANALYST/PROGRAMMER/ PROGRAMMER

CCS Consultants, Inc. is a new and growing subsidiary of Computer Computer Systems, a supply side leader in software and systems for Hewlett Packard 1000 users worldwide. We need self- directed professionals with work experience in the following areas:

- System Tool (Software)
- Telecommunications Planning & Design
- Remote Telecentry & Data Processing
- Graphics (Real-Time & Simulation)
- UNIX/C, PLI & Pascal Prog. & Anal.
- AT&T 3B, WAL IBM Main, Mini & Micro
- HP 1000 Experts of all types

Immediate central NJ openings, pay commensurate with experience. Contact Madhavi Reddy, Sales Manager, CCS Consultants, Inc., 39 West Main St., Holmdel, NJ 07733. (201) 946-3660

UNIX is a registered trademark of Bell Labs

SYSTEM SUPPORT

We are looking for an energetic person with technical background to join our technical support department. You must have a solid background in troubleshooting hardware problems, using computer and VAX related products. Some knowledge of printers and communication configuration needed. Familiarity with MACS-11 (WP software) a definite plus. Degree in computer science/electrical engineering will add to your qualifications. We offer a very competitive salary with excellent opportunities for growth. If interested, please send your resume to: Micro Systems Engineering Corporation, 2400 West Hassell Road, Suite 600, Hoffman Estates, Illinois 60195, Attention Sid. No phone calls please.

TANDEM NonStop II & TXP

Contract programming and software services firm specializing in TANDEM systems and software products is accepting resumes from contract and subcontract programming professionals for assignments in Dallas, Houston, Atlanta, Memphis and Tulsa. Positions require experience with any of the following TANDEM products: TAL, PATHWAY, ENVOY, ENSCRIBE, SMAX, RNAY. Additional experience with COBOL and ACI software products as well as exposure to IBM mainframe environment desired. We offer high hourly rates, all-around training, continuous and varied contract opportunities, relocation assistance and an attitude geared to professional and friendly treatment. Please forward resume, A.S.A.P. to: TRANSCONTINENTAL Interactive, South Central Region, P.O. Box 765168, Dallas, Texas 75376

INSTRUCTOR/COMPUTER SCIENCE

Master's degree preferred, with major in computer science or appropriate area. Possess or qualify for California Community College instructor credential. Teaching experience at Community College and applicable experience in computer industry preferred. Excellent benefits. Starting salary: $18,804 - $33,383 (This is basic contract salary for academic year 177 days. Additional salary paid for any beyond contract for summer school assignments). District application and resume in personnel by 5pm or postmarked by April 10, 1985. Contact: Personnel, Santa Ana College, 17th at Bristol, Santa Ana, CA 92706. (714) 667-3320. AA/EOE.

DATA CENTER MANAGER

L.A. based, high technology software systems development company seeks skilled professional to serve as directorate for 55-person data development center. Must have 10 plus yrs. managerial experience running development center & familiarity with IBM 4341s, DEC 2060, VAX, UNIX, etc. Salary commensurate w/exp. Send confidential resume to: Suite 810, 9841 Airport Blvd., L.A., CA 90045.

FLORIDA - COLORADO OPPORTUNITY FOR PROGRAMMERS - DESIGNERS

Small highly motivated technical organization supports world wide distribution of on-line system 4th generation software. Boca Raton, Florida and Denver, Colorado locations. Systems and advocation programmers. Send resume and salary requirements to:

P.O. Box 3942
Boca Raton, Florida 33432

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

A Direction For The 80's

FORWARD MOVING...

That's the Greyhound direction. We're moving into some exciting areas that offer far reaching career options for individuals also on the move. At Greyhound, you'll move further because there are more places to go. Move your career forward.

EDP AUDITING

Perform EDP audits with the diversified Greyhound Corporation and support other auditors in their duties as they relate to data processing operations. Travel is extensive (50%). If you are BS degreed in Information Systems with 2 years experience as an EDP Auditor; are familiar with mini and micro IBM computer systems, audit retrieval software and a variety of programming languages. Find out why Greyhound could be the most exciting career discovery you'll ever make.

Be part of our new directions for the 80's. Please send your resume, which must include a salary history, in confidence to: **Director of Staffing, Greyhound Corporation, Greyhound Tower #982, Phoenix, AZ 85077**

Equal opportunity employer m/f/v/h

COLLEGE OF THE VIRGIN ISLANDS

Instructor, Assistant or Associate Professor of Data Processing (non-tenure track). Ph.D. in Information Systems, Computer Science or related fields desirable. Master's degree in Information systems and teaching experience acceptable. Industry experience desirable. Must be qualified to teach at least two of the following: COBOL and/or RPG programming, systems analysis and design, information organization and processing, operating systems, or computer hardware and communications. Negotiable compensation $21,201 to $34,007 plus benefits. Address letter of application, resume and three letters of recommendation, by April 8, to: Chairman, Business Administration Division, College of the Virgin Islands, St. Thomas, VI 00802.

EQUAL OPPORTUNITY/ AFFIRMATIVE ACTION EMPLOYER

PROGRAMMER BASIC

Full time programmer position available with growing computer company in Arlington Virginia. Must have at least 3 years experience writing business applications in basic-preferably basic 4/SMC basic language. Salary negotiable, good benefits and excellent potential for advancement. (703) 920-5820

Get your money's worth.

Computerworld will lower your cost-per-hire.

When you're looking to fill MIS/DP positions, there's really only one place you need to advertise. Computerworld.

In every major market, Computerworld reaches more data-processing professionals than the local recruitment media. And we reach them for less.

Over 600,000 computer-involved professionals receive Computerworld every week. That's more than any other computer trade journal, business publication, or general-interest magazine.

Computerworld delivers quality readership, too. Fully 41% of our subscribers read Computerworld's recruitment section every week. And 95% of our subscribers read this section regularly.

Readership like this means responses. In fact, Irven Hammerman (of Weintraub, G, G, H & M Advertising) says:

"When it comes to recruitment advertising for top-notch data processing professionals, there is no other publication. In the past we have tried several competitive publications...As far as my clients and I are concerned, it was a complete waste. It has been our experience that, when data processing professionals of all levels are job hunting, they go straight to Computerworld."

That's why over 4,000 organizations ran more than 6,500 recruitment ads in Computerworld in 1984. The openings they advertised for cover the whole gamut of MIS/DP positions – including systems analysts, computer science & software engineers, directors of MIS/DP, programmers, sales managers, and systems managers.

As a matter of fact, recruitment advertising has made Computerworld the national leader in classified advertising among specialized business publications (according to *Business Marketing* magazine).

Compare costs and the people reached. You'll find that Computerworld is the number one medium for computer-related recruitment advertising.

Find out how we can lower your cost-per-hire. Get your copy of our "1985 Quick Reference Rate Card." Call toll-free (800) 343-6474. In Massachusetts call (617) 879-0700. Call now. We'll help you find the people you need.

Internalists ~~Travel~~ ~~Without~~ ~~Relocation~~

Sperry has achieved a formidable position in the computer software industry. Because of our continued growth, we now seek all levels of professional Systems Internalists to join our Commercial DP Software Services Group. This is an exceptional opportunity to use your technical expertise while satisfying your sense of adventure by traveling to locations throughout the United States and Canada. To apply, you must have a minimum of two years Internals experience in a Sperry 1100 environment.

A college degree is preferred, with backgrounds in one or more of the following areas:

- Internals OS 1100
- Internals DMS 1100
- Internals — Telcon/DCP
- UNIS Specialist
- MAPPER Run Design/Coordination

If the prospect of travel without relocation appeals to you, make the move to Sperry, where we can offer:

- Travel to locations throughout North America
- A lucrative salary
- Per diem
- Paid home visits
- An excellent retirement plan

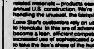
LOCAL INTERVIEWS WILL BE ARRANGED

If you are ready to see more of the world, call COLLECT (703) 558-7230 to arrange a Local Interview or send your resume to: Ric Jarnagin, SPERRY CORPORATION, Information Systems, Technical Services Division, 1901 N. Moore Street, Arlington, VA 22209. An equal opportunity employer. Principals only.

SPERRY

© Sperry Corporation 1985

DATA PROCESSING PROFESSIONALS



Program A Strong Career Future With America's Leading Cement Producer

Advanced MIS Systems Are Vital To Our Continued Leadership

LONE STAR INDUSTRIES is America's foremost supplier of cement and related materials — products essential to over 90% of the $250 billion of annual U.S. construction. We're often the only one in our field capable of handling the unusual, the complex, or the simply gigantic.

Lone Star's customers rely on us for quality and dependability, from Boston to Honolulu. In this era of advancing foreign presence in U.S. industry, we've become a lean, efficient competitor through pragmatic management and increased use of sophisticated computer technology. We are well-positioned to take the lion's share of the hundreds of billions in construction dollars America must spend on rebuilding its infrastructure. Lone Star is therefore able to offer opportunities of unique potential and growth to superior EDP professionals who have the initiative and ability to help us meet that challenge.

Lone Star professionals work on advanced MIS systems, software development, and more in a state-of-the-art 4381 OS/MVS environment — supporting IDMS, CICS, TSO/SPF, ADSO, and COBOL. *Qualifications required:* To join this team, you need 2-4 years' experience, strong COBOL, and IBM hardware background, solid IDMS expertise, and very good interpersonal skills for interface with users and colleagues. These are a minimum.

Lone Star understands that our continued success depends on our ability to attract and keep excellent people. Our strong emphasis on professional development and on promotion from within has created an atmosphere in which achievers are challenged and can grow. As such an achiever, you will earn an outstanding salary and benefits package — including dental, 100% tuition refund, stock purchase, and 401K savings programs.

If you have the expertise to help us achieve our objectives — IN APPLICATIONS such as finance, marketing, manufacturing, and human resources OR IN SYSTEMS — you're someone we'd like to hear from. Just write to our Personnel Department at the address below.

We've been in business for the long term since 1919. When glamour industries fade and new ones take their place, Lone Star Industries will still be here — building, growing, competing...and providing the materials America itself is made of.

LONESTAR — FOR THE LONG TERM

LONE STAR INDUSTRIES, INC.
One Greenwich Plaza, P.O. Box [illegible], Dept. CW 318
Greenwich, Connecticut [illegible]
Equal Opportunity Employer M/F

DIRECTOR, ACADEMIC COMPUTER CENTER.

Administer central academic computing and campus microcomputer facilities; and assist in development of campus LAN. Facilities include VAX-cluster (11/780's) w/ 3.5G on-line storage. Requirements: minimum five years experience in academic or related computing including management and administration; technical expertise in hardware and software; Masters degree (doctorate preferred). Significant teaching and scholarly record is desirable. Salary commensurate with qualifications. Available fall, 1985 (appointment date negotiable to July 1986). Nomination deadline: April 19; Application deadline: May 3, 1985 contact:

Search Committee for Director of Academic Computer Center, c/o Office of Academic Affairs, University of North Carolina at Greensboro, Greensboro, NC 27412. (919) 379-5494.
EEO/AA Employer.

STATE UNIVERSITY OF NEW YORK COLLEGE AT FREDONIA FREDONIA, NEW YORK [illegible] COMPUTING SERVICES

COORDINATOR OF USER SERVICES: [illegible] FORTRAN [illegible] Salary mid 20's depending upon qualifications. [illegible]

MANAGER OF SOFTWARE DEVELOPMENT: [illegible] COBOL [illegible] Salary low 20's depending upon qualifications. [illegible]

These positions are available summer 1985 or [illegible] SUNY College at Fredonia is a 4 year, primarily undergraduate institution [illegible] by April 15 to the appropriate Search Committee. SUNY College at Fredonia is an Equal Opportunity Affirmative Action Employer.

FULL TIME IDMS INSTRUCTOR/ CONSULTANT

For rapidly expanding software training/consulting firm. Flexible hours. Excellent salary and benefits. Send resume to:

**ICCS Inc.
10 East 21 Street
Third Floor
New York, NY 10010**

OR

Call Mike (212) 777-[illegible]

Director, Foreign Sales: [illegible] Chicago, IL [illegible].

general employment enterprises, inc.

SERVING THE NATION SINCE 1893

COAST TO COAST NETWORK REFERRAL SERVICE

We specialize in Data Processing, Engineering, Electronics, Management Services, Office Services, Financial & Executive Placement.

[illegible]

FAR WEST

[illegible]

CENTRAL AND MIDDLE WEST

[illegible]

NORTHEAST

[illegible]

SOUTHWEST

[illegible]

CANADA

[illegible]

SOUTHEAST

[illegible]

general employment enterprises, inc.

Corporate Offices, 150 S. Wacker Dr., Chicago, IL
Listed on American Stock Exchange
1-800-[illegible]

BUY - SELL - SWAP

Computerworld CLASSIFIEDS:

Our business is to help you improve ***yours***— via programmers, analysts, engineers, terminals, printers, software packages, computer time, computer services, office space, advertising for seminars & conferences, business opportunities, etc...***AND*** ...

...exposure to an audience of over half a million readers nationwide... ...every week.

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

4381-P2

[redacted]

[redacted]
(313) 774 7400

[redacted]

LDLR AEL

THE SOURCE FOR series/1
ECONOCOM

• BUY • SELL
• LEASE
NEW OR USED

[redacted]
(901) 767 9130 or
(800) 238 3098
AEL

WHY FORTUNE 500 COMPANIES LEASE FROM RANDOLPH.

1 FINANCIAL STABILITY. As an important part of the Bank of Boston, one of the nation's oldest and leading financial institutions, Randolph has a built-in financial stability that continues to be unique in the third-party computer leasing industry.

2 OVER 20 YEARS IN THE BUSINESS. Randolph has been serving Fortune 500 companies since 1965 . . . a history that gives added assurance that we'll continue as a leader in the industry.

3 HIGH-TECH LEASING IS OUR ONLY BUSINESS. Leasing computers is a lot different than leasing boxcars. Computer technology changes almost daily and with it the value of the equipment. Randolph not only keeps current on the state of the art but has learned to anticipate important changes.

4 ACTIVE REMARKETING DIVISION. Our unique customer support assures maximum return on investments in computer equipment which is no longer in use.

5 UNIQUE SERVICE. In addition to the manufacturer's service Randolph has a technical staff that is on call to help reconfigure systems to meet the changing requirements of large companies.

6 COAST-TO-COAST RANDOLPH. Even though large companies may have computer sites all over the country Randolph is right there to serve them. We presently have customers in over 300 cities and towns from Maine to Hawaii.

7 WE SPECIALIZE IN SOLVING PROBLEMS. Large companies can have a variety of problems . . . like machines installed on a rental basis, being stuck with a lease on an old machine or long waits for delivery. Whatever the problem, we can tailor a lease that will fit the need.

8 WE ARE DP PROFESSIONALS. At Randolph, our people have an average of 16 years in the DP industry . . . from 360's to 3084's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

9 WE GO BEYOND COMPUTERS. Randolph has been dealing with peripherals from the very beginning. Now we're involved in leasing communications systems and office automation equipment because that's what Fortune 500 companies demand.

10 WE SAVE THEM MONEY . . . LOTS OF MONEY. Randolph has been saving its customers 30% to 70% of their DP hardware dollars. Fortune 500 companies know leasing is still the most financially attractive method of acquiring computer equipment at low cost without draining working capital.

HOW ABOUT YOU? What we've done for so many of the Fortune 500 companies we can do for you. Call William Rooney, Vice President, 800-243-5307.

537 Steamboat Road
Greenwich, Connecticut 06830
203-661-4200 • 800-243-5307

Randolph

TWENTIETH 1965 Randolph 1985 ANNIVERSARY

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON BANK OF BOSTON

DEC INVENTORY SALE

11E23-FE(New)	$ 7,500
SV-CXWMA-GK(New)	$27,000
SXRA500(New)	$ 7,000
MS750-CB(New)	$ 5,500
VT220-A Terminals(New)	$ 900
PRO-350(New)	$ 2,500
LA100-YA(Used)	$ 900
278A-AM(Used)	$ 2,000
KDJ11-AA(New)	$ 1,700
MXV11-B2(New)	$ 90
MXV11-BF(New)	$ 900
1103-EA(New)	$ 250
KDF11-BA(New)	$ 750
RAINBOW PC(New)	$ 3,000
RD50(New)	$ 1,000
WPS-8 SOFTWARE	$ 300

Call (312) 679-1566
Madeline Roth

SALES LEASING

TexCom
1-800-833-9119

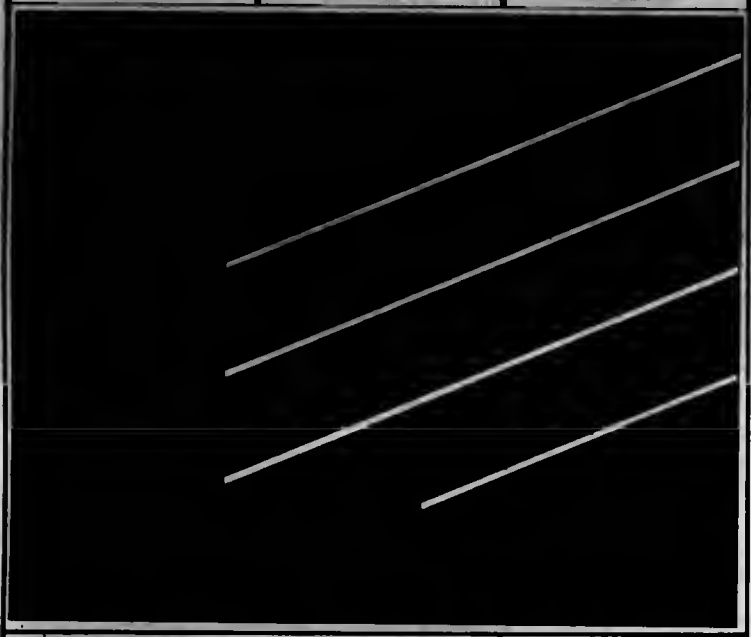
S/36 S/38

SERIES/1

[redacted] DISPLAYWRITERS AND AL[redacted]

LDLR AEL

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP



SERIES I.
NEW, USED, FEATURES, & CDC PERIPHERALS.
HARD TO FIND NEW PRODUCTS IN STOCK.

34, 36, 38.
S/36's UNDER IBM LIST.
72 HOUR UPGRADES, S/36 FEATURES.

4331/4341.
TAPE, DISK, PRINTERS,
FLEXIBLE LEASE ALTERNATIVES.

5110, 5120, 5/23.
DISPLAYWRITERS IN STOCK NOW.

800/328-3884
IN MINNESOTA, CALL 612/936-9280

We do an exceptional job— our clients do repeat business.

X-ceptional!

XERXES COMPUTER SALES
10750 Bren Road East
Minnetonka, MN 55343

IBM SERIES I PROCESSORS PERIPHERALS
4300
34 36 38
1-800-328-7938
data 3
computer corporation
11000 PRAIRIE LAKES DR. • EDEN PRAIRIE, MN • 55344

DEC
BUY — SELL — LEASE

VAX
11/730 11/750 11/780
SYSTEMS — MEMORY
OPTIONS — MODULES
NEW & USED

TEKTRONIX
4113 4114
UNUSED
MOST OPTIONS

FUJITSU
ALL DRIVES AVAILABLE

EMULEX
CONTROLLERS
COMMUNICATIONS

DEC
OPTIONS — MODULES
MEMORY — SPARES

IBM
4978 MOD I

NATIONAL
COMPUTER EXCHANGE
600 NORTH LUNAR AVENUE
BREA, CALIFORNIA 92621
714-990-5988

800-624-9299

- BUY
- SELL
- SWAP

Well-Equipped To Serve You In Buying Or Selling

- HARDWARE
- SOFTWARE
- COMPUTER TIME & SERVICES

Over 500,000 computer people read COMPUTERWORLD every week.

So placing an advertisement with us is going to help you take care of your computer-related business.... very quickly.

Call 1-800-343-6474
(in Mass.) 617-879-0700

WILL BUY...
SELL...LEASE...
SYSTEMS 34/36/38
CPU
- Savings of 10% to 60%
- New or previous-owner processors available
- IBM and General Business Technology peripherals
- Immediate delivery on most equipment
- IBM maintenance guaranteed
- Trade-ins welcome
- Flexible leasing terms

CALL: 800/222-2226 503/222-2226
CPU SALES & LEASING, INC.
205 North Page Street • Portland, Oregon 97227
MEMBER: AMERICAN SOCIETY OF COMPUTER DEALERS

FOR SALE-LEASE
3081 D-16, 3082 0-16 W/F 4650, 3087-001, 3089-001, 3278 AO2 with 4641. Available April 15, 1985.
SCOTT Computer Leasing Inc.
6711 Mississauga Rd.
Mississauga, Ontario L5N 2W3
(416) 821-4440

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

NEW AND USED
CPUs • PERIPHERALS
CRT's • PRINTERS • TRADES ACCEPTED
IBM Sys/34 • 36 • 38
QUICK DELIVERY • FEATURES • DISK UPGRADES
BUY • SELL • LEASE
Call Today (612) 944-5280

DATA GENERAL

Hanson Data Systems

CARLYN
COMPUTER SYSTEMS
5105Q BACKLICK ROAD, ANNANDALE, VA 22003

Inflation Fighters
Quality & Savings
Stringly used. Money Back Guarantee. Full Reels. All External Labels Removed. Guaranteed for use at 800 BPI through 6250 BPI.
2400' Reel $4.25 ea.
1200' Reel $4.25 ea.
600' Reel $3.50 ea.
All Tapes with Hanging Seals
We pay freight on orders over 200 tapes. All orders shipped within 48 hours.
Call or Write
Computer Tape Mart
4AA Seabro Avenue
N. Amityville, New York 11701
[516] 842-8512

3725
LEASES
Your Position or Ours
Centron DPL Company
800 532 7532

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate). For the Bulletin Board, ads may be sent by mail, telecopier or given over the phone, no camera ready ads will be accepted. Space is available in one column by one inch deep units only. They are set up using a simple format with standard typefaces and no borders or logos are allowed. The cost of one standard unit is $140.00. These units may be combined to form deeper ads.

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $144.90 per column inch. (Each column is 1 13/16") Minimum size is two column inches (1 13/16" wide by 2" deep) and costs $289.80 per insertion. Extra space is available in half-inch increments and costs $72.45. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us.) WE MUST HAVE YOUR PAYMENT IN ADVANCE, or a Purchase Order Number. Any extensions on this policy must be made through our Credit Department.

Ad size desired:_____
_____ columns wide by ____ inches deep.
Issue Date(s):_____
Section:_____
Signature:_____
Name:_____
Company:_____
Title:_____
Address:_____
_____
Telephone:_____

Send this form to:
COMPUTERWORLD
CLASSIFIED ADVERTISING
375 Cochituate Road
Box 880
Framingham, MA 01701
Telecopier service is available.
Call: 800-343-6474 or 617-879-0700
extension 410 or 451

AMERICAN DELIVERS
DEC*
World's #1 DEC Dealer Since 1966
VAX, Peripherals and All 11 Series
VAX 780's READY TO CLUSTER
CALL 617-437-7600
AMERICAN USED COMPUTER
P.O. Box 68, Kenmore Station, Boston, MA 02215
*DEC is a trademark of Digital Equipment Corporation
Dept. CS/085

IBM 4381 M2
Short Term Lease
Available Immediately
Contact Cliff Tait
Highline Financial Services, Inc.
1861 9th Street
Suite 320
Boulder, Colorado 80302
303-443-7267

IBM
3270

SERIES/1
Buying, selling and leasing all models and peripherals of Series/1. Immediate delivery.
PIONEER COMPUTER MARKETING
11448 Pagemill Road
Dallas, Texas 75243
1-800/423-3618
In Texas 214/343-2904

For Sale
IBM 370-145
½ Meg, 3215 Console, IFA
Call Or Write
FBC, Inc.
87 Grandview Avenue
Waterbury, CT 06708
(203) 575-1022

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

HP

TELEX 756627
encore
(213) 452-9117

CLIP AND MAIL

SERIES/1 AND SPECIAL PRODUCTS
BUY • SELL • LEASE
NEW OR USED
• ALL PERIPHERALS
• 4966-B AND E NOW!
• ATT AND WANG

SPECIAL!!
• 3178-34 AND 36 MO. RATES
• 3278/2 — ALL KEYBOARDS
QUANTITY NOW!!

• 3360-A2
• 3360-B2
• 3360-C2
LOWEST PRICES EVER! AVAILABLE NOW!!!

• 4341-L1
• 3436-6 SINGLES
• 3420-6 DUALS
• 3803-2 CONTROL
WILL SHIP TO YOU THIS WEEK!

SPECIAL: AVAILABLE TODAY
3287-2
6788
8331
CART. RIBBON
$3,500 EACH
QUANTITY AVAILABLE!

INVENTORY SALE
3383-B1 | 3340-F3X, E3X
3680-A1, 2, 3 | 3370-A12, B12
3276-2 | 3360-A, B, C
3360-5 | 3360-B3F
3411-3 | 3791-1
3340,-A, B | 3751-1
3344, B2 | 3761-1
8703-35

SPECIAL OFFER!
3178-C2 $33/MO.-24 MOS.
OR
$29/MO.-36 MOS.
IMMEDIATE AVAILABILITY!

SYSTEM/36
NEW AND USED EQUIPMENT
CALL FOR PROMPT QUOTE!

WANT TO BUY
• 3803-2 • 3420's
• 3830-2 • 3861-K
• 3360's • 3803-J
• 3660's • 4341
• 5291-1 • 5234-2
• 3375's • 5340-F

ECONOCOM IN MANY INSTANCES, RIGHT IN YOUR OWN BACK YARD.

ECONOMIC COMPUTER SALES, INC.
CORPORATE OFFICES
845 CROSSOVER LANE
P.O. BOX 249097
MEMPHIS, TENNESSEE 38124
901-767-9120 OR 800-238-3666

• LOS ANGELES, CALIFORNIA 714-283-0551
• ATLANTA, GEORGIA 404/955-1331
• LOUISVILLE, KENTUCKY 502-491-1974
• DALLAS, TEXAS 214-385-0000
• BIRMINGHAM, ALABAMA 205-995-9393
• LITTLE ROCK, ARKANSAS 501-224-4242
• ACTON, MASSACHUSETTS 617-263-2400
• DENVER, COLORADO 303-458-1600
• MIAMI, FLORIDA 305-763-8010

ECONOCOM ADHERES TO THE HIGH STANDARDS OF ETHICAL CONDUCT REQUIRED FOR MEMBERSHIP IN:
CDMA ADAPSO CSP-C

ECONOCOM is a service mark of Economic Computer Sales, Inc.

CLIP AND MAIL

MODEMS

DataGeneral
• SYSTEMS / ADD ONS
• LOCAL FIELD SERVICE
• NATIONAL DEPOT REPAIR
• MV/3000 II 30% DISCOUNT AVAILABLE FOR LEASE
• ALL CABLES
BUY • SELL • LEASE
PISONE INTERNATIONAL
214-788-1600 217-351-7502

IBM SYSTEMS 34, 36, 38, 4300

UPGRADES
PRINTERS
CONTROLLERS
TAPES
DISKS
TERMINALS
FEATURES

• Guaranteed for IBM Maintenance
• Immediate Delivery
• Competitive Prices

ICS

• BUY
• SELL
• LEASE
(Short or Long Term)

INTERNATIONAL COMPUTER SALES, INC. • 815 E. 1st ST., SUITE A • TUSTIN, CA 92680 (714) 838-3717

Buy & Sell Your Equipment
BUY-SELL SWAP.
Call COMPUTERWORLD To Place Your Ad
1-800-343-6474
In Mass. (617) 879-0700

3287
1C and 2C
Information Processing Systems, Inc.
(201) 262-9500

The Bulletin Board

Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease

DEC

DEC BARGAINS

11/84A CPU Bkt	$1,650
11/44 KE44-A "DE"	$2,775
11/44 CPU Bkt KD11Z	$4,999
BDV11-AA	$395
DL11-W	$165
DR780-AA	$3,400
FPF11	$1,875
FP11A	$995
KK11-A	$1,275
MS11-LD	$750
MS11-MB	$750
MS11-PB	2,475
MS780-DD	$2,700
MS780-E MS575	$3,500
MS780-E MS575	$3,300
MSV11-LF	$995
MSV11-PL	$1,200
VAX 11/80 MS780-FD	$1,775

Call Ray at CIS, Inc. (617) 275-6660

DEC

WINTER SPECIALS

CDC 9762, Refurb $2,000
LA120-DA, New 1,895
LP11-CA, New 7,450
RA80-AC, Unused 7,750
MS780-E, Unused 15,500
VAX 780 CPU 4MB, Used/Refurb $84,500
MS780-CC $2,695
TS11-CA, Unused $3,950
H7100-A $400
DMR11-AC, Unused.. $2,490

DEC cables/Price computers available

SEVCO INC.
(617) 436-6630
(617) 436-8331

DEC

USED DEC EQUIPMENT

PDP 11-84SC 256KB MOS $5500
H9642AA Processor Cabinet $950
H9640 Expansion Cabinet $950
MR11-LD 256KB add-in MOS $1500
DD11-DK Bootstrap $600
H7765-BA Battery Backup $1,200
KT24 Memory Management $540
FPF11 Floating Point $1000
RL211-AK Disk Drive, Pack $5995
RL02-A Disk Drive, Pack $1,395
7 RL02-SF Disk Packs (each) $175
MR11-F Clock $395
RM03-AA Disk Drive, $5695
5 RA60-AA Disk Drives (ea) $11500
RH70-A Controller Cabinet $1600
DMR11-AC with Cables (each) $2000
10 2M RA60 Disk Packs (ea) $995
5 DEC/CDC RA60 Packs (ea) $150

Ken Goodwin
(508) 692-3484

DEC

VAX

SYSTEMS & OPTIONS SPECIALIST

C.B. SMITH & ASSOC. INC.
(713) 451-3112
ASK FOR C.D.

NEW DEC SYSTEMS
42% OFF LIST

MICROPDP-11 $5995
10 Meg Winchester, RD51
1 Million Floppy Drive
256 KB Memory
DZV11-DF 4 Line Controller
Current O.S. License
11/73s, Other Configurations
Call DEC Systems (617) 468-5100

DEC

2.9M ECLIPSE COMPUTERS
C350 1/2 Meg, C350 1/4 Meg
CDC 9766 with XYLOGICS Controller
1600 BPI PE 9 Drive
4257 COMM CHASSIS, ALM 16, SLM 1
Auto Dialup, I/O Bus Repeater
2155 (2) Terminals
DG 10 Meg Cartridge Disk
$25,000 or Best Offer
Brand Corporation, (201) 666-7600

NEW VAX'S

11/780	DMF32-LP
XA-AE	LA100-BA
TU80	QD001-HM
RUA81-AA	QD001-DZ

Ready To Ship.
Clinton Digital, Inc.
(617) 877-8664

DEC

Unused DEC

MS780-EC	$20,000
FP780-AA	$7,000
TU80-CA	$6,900
RA81-AA, CA	Call
RA60-AA, CA	Call

Mannamp Computers Inc.
(718) 934-6025

ATTN VAX USERS
Discounted...

RUA81-CA	VT 240
VT 241	Floating Points
Upgrade Kits	Memory

Digital Computer Consulting
(617) 567-2900

The Bulletin Board

Buy • Sell • Lease • Buy • Sell

DEC

VT 220s
Only $935 ea.
Call Digital Computer Consulting
(617) 587-2900

BUY • SELL • TRADE
[illegible]
NEW YORK COMPUTER EXCHANGE
[illegible]

For Sale
VAX11/750-CA [illegible]
DZ-11 [illegible]
[illegible] DMF 32-LA
RA80 & RA80 D. D.
TU80 Tape D.
Call R. [illegible]
(312) [illegible]

SURPLUS EQUIPMENT
[illegible]

DEC NEW & USED
BUY • SELL • EXCHANGE
Systems • Processors • Memory
Options • Peripherals • Modules
LAKEWOOD COMPUTER CORP.
[illegible]

IBM

Greyhound Capital Corporation
Overnight
3274 Controllers
3178/3278 Displays
3287 Printers
Tim Stone/
Debbie Nicholas
800/528-0358

FOR SALE OR LEASE
IBM
CPU
4341-P12 Available [illegible]
4341-M02 Available [illegible]
PERIPHERALS
[illegible]
SLF Computer Company, Inc.
[illegible]

Buy .... Sell .... Lease
IBM MICR
3890 - 1419
1255 - 3894
(813) 722-[illegible]
COMPUWARE

IBM

Want To Buy
SYS/38's
Call Bob Or Joe
800-433-4148
(213) 212-3111

5251-011
$1150. Each
5291-001
$1550. Each
Cleaned & Refurbished
(415) 655-5711

IBM 6670
LASER PRINTER
Sell or Lease
Call Dick Opelek
(216) 248-7878

SALE OR LEASE
MODEMS
3865-1
3865-2
3864-2
Call John Volpenheim
(513) 721-3300

Sale-Available Immediately
IBM Displaywriters & Printers
All Equipment Maintenance Certified
Arthur D Little, Inc.
Call: Daniel [illegible]
(617) 864-5770, Ext 2112

For Sale
3081
24 Meg/24 Channel
Available 4-7-85
(803) 735-4044

FOR SALE
[illegible]
WHITE OAK CORPORATION
[illegible] 747-1027

For Sale
IBM System 34
Computer
[illegible] Megabyte
300 Line/Minute Printer
$14,750.
Contact Latham & Assoc., Inc.
[illegible]

Fox Computer Sales
Buy • Sell • Rent • Lease
Datapoint • IBM
Teletype
W.T.B.: Used Equipment
(216) 449-[illegible]

FOR SALE
By Owner
[illegible]
Ask for Wayne or Dan

IBM System 38
[illegible]

20 MONTH SUBLEASE
Available Now
4341 M02
4341 L01
4341 L10
AMERICAN CANCER SOCIETY
John C. [illegible]
(212) 736-[illegible]

IBM

SALE/LEASE
S/34 UPGRADES
Memory Disk Storage
Peripherals
Call Louis Felder
Computer Merchants Inc.
(914) 238-9631

Sale/Lease
4331-J1
3411-03
Call Andy
Ceres Capital Corp.
1-800-532-0082
NY (212) 279-4467

SALE/LEASE
3640-B1 5224-2
3505-B2 3784-A4
3747-1 3774-61C
Please Call Matt Staustein
(914) 238-9631
Computer Merchants Inc.

E, F, J, or M's
3705
Any Configuration
Price Below Market
[illegible]
(513) 231-0290

For Sale
IBM SYSTEM 34's
Any Model or Configuration
Disk and Memory Upgrades
Available Within 30 Days
5340-C25 $2,750
Eligible For IBM Maintenance
Call Pat
(813) [illegible] ext. 5

SALE/LEASE
4361-L5
Call Bill Hagan
4341-K1
Call Bill Cahill
Computer Merchants Inc.
(914) 238-9631

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(813) [illegible]

[illegible]
DATAMARC
[illegible] Atlanta, GA [illegible]

WANG

BUY • SELL
MVP/LVP • OIS • VS • PC
SYSTEMS IN INVENTORY
OIS-60 • 5536-4
GENESIS
EQUIPMENT MARKETING
GEM
(602) 277-8230

ERST Is The Leading Dealer
In WANG Equipment:
2200 • VS • WP • PC
Rentals & Leasing On Request
Toll Free: 1-800-FOR ERST
In New York: (212) 431-1166
ERST
225 Lafayette, NYC 10012

VS100 for Sale
Repossessed
Lots of peripherals
Call 800-526-0791

WANG

Buy • Sell
Used
Wang Equipment
[illegible]

BUY • SELL • LEASE
All models of Wang equipment and plug compatibles
SPECIAL OF THE WEEK:
[illegible] CRTs $1,795.00
ICA
Founded 1981 by Wang ex-employees
(404) 977-[illegible] or (800) 241-3159

HONEYWELL

LEVEL 6 & DPS 6 EQUIPMENT
NEW & REFURBISHED
Systems • Peripherals • Memory
CRTs • Applications Software
ANNOUNCING 3 COMPATIBLE L6/DPS6 PRODUCTS
• 1000 And 1300 LPM Band Printers
• [illegible] MB Winchester Disk Drives
Reasonable
Lease Terms Available
Low Prices - Prompt Delivery
[illegible] Computer Services Ltd.
100 Bearfoot Rd.
Northboro, MA 01532
(617) [illegible]
TWX 710-347-7574

HEWLETT PACKARD

HP3000
SERIES 64 & 68
WANTED
CALL IMMEDIATELY
Referral Fees Available
213/458-2643
800/643-4954

HP-250
SYSTEMS • PERIPHERALS • MEMORY
2622D Emulation Software
For HP-150/9816/125/IBM-PC
New & Used HP
Personal Computers
XMITAL DATA COMM
(408) 747-1239

HP 3000
BUY • SELL • RENT • LEASE
Complete Systems
Processors • Peripherals • Parts
ConAm Corporation
Santa Monica, California
(213) 458-2643 (800) 643-4954
Telex: 215 604 FCS UR

BURROUGHS

BUY SELL LEASE
BURROUGHS
DEPOT MAINTENANCE
Over $4,000,000
In Stock
Computer Provisions
(216) 248-7878
(Member IBDA)

BURROUGHS

FOR SALE OR LEASE
B1865 w/2MB Mem, 11 line Adapters, 2 Tapes (1600 BPI)
4 disk drives (1 206, 1 207)
1 printer (650 LPM), 44 CRTs
Dan Thompson
(505) 243-8781

PRIME

LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS
...SAVINGS TO 90%
Peripherals also available
1st SOLUTIONS, INC.
2001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-[illegible]
ASK FOR DON OR MATT

MISC.

PRINTERS
[illegible]
CompuCo Inc.
(619) 753-7680

SELL/LEASE
XEROX 9700
LASER PRINTERS
All Models with Accessories
Available Now
Call Mark Roberts
RIDGEFIELD FINANCIAL GROUP
[illegible]

[illegible]

Laser Printers
Xerox 2700-II
20% Below List
Wang Interface Available
New, Quantities
Excel Inc.
800-634-3891
NY (718) 335-[illegible]

MISC.

Buy/Sell
Word Processors
IBM...Xerox...Wang...DEC
...CPT...Lanier...Etc.
Computers & Peripherals
Also Available
Call Excel Inc. 800-634-3891
NY (718) [illegible]

SALE
Selographic Antares 2200
1600 BPI Tape
Pertec disk
G. Smith
201-499-4015

[illegible]
Complete $17,000
(412) 795-1779

CRDS Universe 68 Computer 5 serial Ports, Dual 68K with 4K cache, 512KB, RAM, 1MB Floppy multi user/tasking oper. syst. Complete hard/soft documentation. Call Paul at (617) 264-4090 or after 5:00 pm (617) 486-3060.

Buy • Sell • Lease
• Short Term Rentals •
IBM & DATAPOINT
AVAIL. IMMEDIATELY
Cougar Computer Corp.
(219) 261-3666
Member CDLA

DATA GENERAL

CRT's
D-410 .... $1,095.
D-460 .... $1,295.
Ames Sciences, Inc.
(301) 228-8100

8706 MV8000/6000 2Mb Memory Boards - Available
Now .... Special Sale
C-350 512Kb System $5,900
6061 192Mb Disk S/S $7,500
6122A 277Mb Disk $12,800
Int'l. Computing Systems
(612) 641-3841

ORDER FORM
COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be clearly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $140.00 (One unit minimum and no fractional units allowed.) There are no agency commisions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Date(s): ____________
Signature: ____________
Name: ____________
Title: ____________
Company: ____________
Address: ____________
Telephone: ____________

Send this form to:
COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 880,
Framingham, MA 01701

617-879-0700 800-343-6474

SOFTWARE FOR SALE

Sell Your Software In the Classified Pages of Computerworld

Call 800-343-6474 (or 617-879-0700) for more info.

SOFTWARE CONVERSION SOLUTIONS

Datawave provides the software translation system for your complex conversion problems. Over 15 years of conversion experience has resulted in thousands of satisfied customers, worldwide.

- COBOL to COBOL
- AUTOCODER/RPG to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- 360/ALC to 68/ALC
- PL/1 to COBOL
- RPG/RPG II to COBOL
- RPG/RPG II to PL/1

Datawave offers services & software to meet your needs. For more information, call or write today.

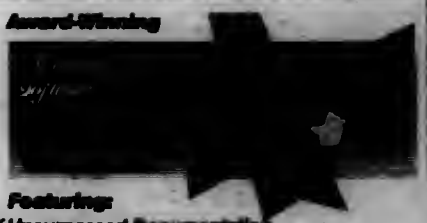
The Conversion Software People
DATAWAVE, INC.
2545 Elmwood Avenue
Suffolk, New York 14217
Phone (716) 876-8722
TELEX 91510

PC IZZY/38

THIS SPACE FOR HIRE.

[Inquire at Classified Advertising Dept.]

Award-Winning



Featuring:
- *Unsurpassed Documentation*
- *Large Scale Integration*
- *User-Defined Vocabulary*
- *Paperless Processing*

General Accounting	Payroll/Personnel
Accounts Payable	Book to Tax Accounting
Accounts Receivable	Order Processing
Equipment & Fixed Assets	Inventory Management
Financial Reporting	Sales Analysis
Planning & Budgeting	Oil & Gas
Job Cost Accounting	Spread Sheet Processor

J.D. Edwards & Company

4949 S. Syracuse / Suite 9000
Denver, CO 80237
303/773-3732

Dallas — 214/458-0836
Houston — 713/880-8278
San Francisco — 415/571-5755
Newport Beach — 714/955-0118
Bakersfield, CA — 805/327-1911
Telex — 910/493-1477

IBM Value Added Remarketer

TIME & SERVICES

DATA CENTER SERVICES

- ★ MILLENNIUM
- ★ NOMAD2
- ★ OS/MVS/SP
- ★ TSO/SPF
- ★ VM/370
- ★ OCS
- ★ DOS/VSE/SCP
- ★ IMS/DBDC
- ★ CMS
- ★ RJE
- ★ TELENET ACCESS

Info Center Products
Access By Micros
EXCELLENT SERVICE LEVELS
COMPETITIVE RATES
VOLUME DISCOUNTS

BURNS COMPUTING SERVICES, INC.

MIDWEST: 312/691-2000
EAST COAST: 215/398-3000

MILLENNIUM is a registered trademark of McCormack & Dodge
NOMAD2 is a trademark of DGB COMPUTING SERVICES, INC

THE SOURCE FOR REMOTE PROCESSING

- On-line/Batch processing
- MVS, VM, DOS environments
- Block time available
- Nationwide access via Tymnet
- Xerox 9700 Laser Printer
- Disaster recovery services
- Decision support software including SAS and IFPS
- Bank processing services

Call (919)469-3325 for more information or write to CompuSource c/o Marketing Division 1155 Kildaire Farm Road, Cary, NC 27511.

COMPUSOURCE

COMPUTER TIME AVAILABLE

IBM 4331
DOS/VSE - ICCF
3370-3330 DISKS
1600/6250 TAPES
ALL SHIFTS AVAILABLE
RATE NEGOTIABLE
RESOURCES INCLUDED
CALL DENNIS LAMATRA
FIDUCIARY
SPECIAL SERVICES
201 792-6667

DATA PRINTER SALES • SERVICE

Model's 6644 - 1200 Series

Sparse Discounts 10% to 30%
Per Call: Service, Ribbons
Refurbs, Maint Contracts

Printer Consulting Services
P.O. Box 295
Plantsville, CT 06479
(203) 621-8366

COMPUTER TIME RENTAL

IBM 4331
DOS/VSE - ICCF
All Shifts Available
3370 Disk, 3420 Tape
800/1600 Density
1403-N1,
2540 Reader/Punch
Reasonable Rates
Contact: Al Palmo
Rockaway Data Services
(212) 997-1439

ICOTECH

Innovative Computer Techniques

COMPUTER SERVICES
IBM 3081 DEC-10

- Remote Job Entry
- Batch Processing
- Optical Mark Reading
- Online Processing
- Timesharing
- Laser Printing

COMPUTER OUTPUT MICROFILM

- Datagraphic Mini Auto-Comp
- Datagraphic Datamaster
- 4250 SPI Capability
- Free Testing

Route 202
Raritan, NJ 08869
201-685-0100
Contact: Joyce Bagarella

COMPUTER TIME & TIMESHARING

- We broker computer time.
- IBM timesharing our specialty.
- NEVER a charge to the Buyer.
- Our fees paid by the Seller.

Call Don Selden at
Computer Resources, Inc.
(201) 666-6160

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $144.90 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $289.80 per insertion. Extra space is available in half-inch increments and costs $72.45. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us), WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5563/5584. Telex: 22644.

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4396133. Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brasil, Services a Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566 cwdan.

England: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London WC1 8UT. Phone: 01-831-9252, Telex: 262346.

Euan Rose, Bill Dunlop, Stephen Thomas, Beare Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

France: Axel Leblois, Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 747.12.72. Telex: 613234 F.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l, Via Rosellini 12, 20124 Milano.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3682. Telex: 252-4217 (Computerworld Japan only).

H. Kajiyama, Tokyo Representative' Group, Sanshin Kogyo Bldg. 3F, 2-10 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Norway: Mr. Morton Hansen, Gen. Mgr., CW Norge A/S, Hovinveien 43, P.O. Box 2662, Toeyen, Oslo 6. Phone: 2/647725. Telex: (856) 7647725.

Saudi Arabia: Mr. Omar Duzuki, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6519990. Telex: (928) 401205.

Southeast Asia: Mr. David Naidu, General Manager, Asia Computerworld, Pte. Ltd., 11-06/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-4444. Telex: (786) RS 37003

Melvyn Bennett, Regional Sales Mgr., Asia Computerworld Pte. Ltd., 2023 Swire House, 9 Connaught Rd. Central, Hong Kong. Phone: 210395. Telex: (780) 72827 HX COMWR.

Spain: Neil Kelley, Computerworld/Espana, Barquillo 21, Madrid 4. Phone: 231-23-85; 231-23-86; 231-23-88. Telex: 47894(CW E).

Sweden: Bengt Mamfeldt, Nova Media AB Sodra Hamnvagen 22, S-115-41 Stockholm. Phone: 46-8-67-91-80. Telex: 14904 NOVACW.

The Netherlands: Johannes A. Witvoet, Mgr. Dir., Computerworld Benelux, Van Eeghenstraat 84, 1071 GK Amsterdam. Phone: 020-646426. Telex: (844) 18242.

Venezuela: Kalman Von, Vajna Nagy, CW Communicaciones CRL Torre Maracaibo, piso 13, Oficina H, Av. Libertador, Caracas. Phone: 72-76-30.

West Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

ADVERTISERS INDEX

Computerworld Sales Offices

Publisher/Vice-President/Donald E. Fagan

Director/National Sales/Edward P. Marecki
Manager/Marketing & Sales Operations/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

EASTERN SALES OFFICE (617) 879-0700
Northern Regional Manager/Ronald Medeiros
District Managers/Jim McClure, Michael F. Hallahan
David Petersen, Bill Costigan
Account Manager/Robert Driscoll
Sales Assistant/Abbe Langley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
Midwest Regional Manager/Ross Gronbeck
District Managers/Arthur Kellerman, Kevin McPherson
Sales Assistant/Joan F. Strykowski
COMPUTERWORLD, 2000 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1350
Eastern Regional Director/Richard J. Masters
Senior District Manager/Craig Chaney
District Managers/Ray Cantor, Joan Daly, Fred La Sapio
Account Manager/Kathi M. Paterna
Sales Assistant/Sue Lesser
COMPUTERWORLD, Perennus Plaza I,
140 Route 17 North, Perennus, NJ 07932

LOS ANGELES SALES OFFICE (714) 261-1230
District Managers/Barret Hockswender, Robert Meth
Western Regional Director/William J. Healey
COMPUTERWORLD, 18008 Sky Park Circle, Suite 260,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7330
Western Regional Director/William J. Healey
Senior District Manager/Barry Millman
District Managers/Chris Christensen, Mark V. Glaser
Roberta Cramer
Account Manager/Jo Classified/Nicole Shellhamer
COMPUTERWORLD, 300 Broadway, Suite 28,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0739
District Manager/Jeffrey Mancini
Eastern Regional Director/Richard J. Masters
Sales Assistant/Lynne Tye
COMPUTERWORLD, 1400 Lake Hearn Drive, Suite 330
Atlanta, GA 30319

HOUSTON SALES OFFICE (713) 682-1220
District Manager/William Mahoney
Western Regional Director/William J. Healey
COMPUTERWORLD, 8401 Westheimer, Suite 110,
Houston, TX 77063

CLASSIFIED ADVERTISING (617) 879-0700
Midwest Sales Manager/Walter E. Kett
National Recruitment Sales Manager/Al DeMitte
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diane La Muraglia
Manager, East Coast/Frank Cutitta
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700
Manager, West Coast/Isabella Bonaguidi
COMPUTERWORLD, 1060 Marsh Road
Menlo Park, CA 94025
(415) 328-8864

CW COMMUNICATIONS/INC.
Board Chairman
Patrick J. McGovern
President
W. Walter Boyd
Executive Vice-President
Lee Vidmar

Publisher/Vice-President, Donald E. Fagan. Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phelan. VP-Finance, William P. Murphy. VP-Editorial, John Whitmarsh.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700. Telex: 95-1163.

SALES — National Director, Edward P. Marecki.National Sales Manager/Classified Advertising, Walter S. Kett. Manager/Marketing & Sales Operations, Kathy Doyle. Corporate Advertising Administrator, Frank Collins. National Recruitment Sales Manager, Al DeMitte. Display Advertising Manager, Anne Hadley. Display Advertising, Maureen Carter, Carolyn Medeiros, George W. Griffin, Suzanne Wenet, Lisa Morse. Classified Operations Manager, Cynthia Delany.

COMMUNICATION SERVICES — Group Vice-President, Jack Edmonston. Director Research, Kathryn Dinneen. Sales Promotion Director, Liz Johnson.

PRODUCTION — Production Director, Peter Holm. Production Manager, Marlene Stibal. Paste-Up Manager, Trish Gaudette. Typesetting Manager, Carol Polack. Art Director, Tom Monahan.

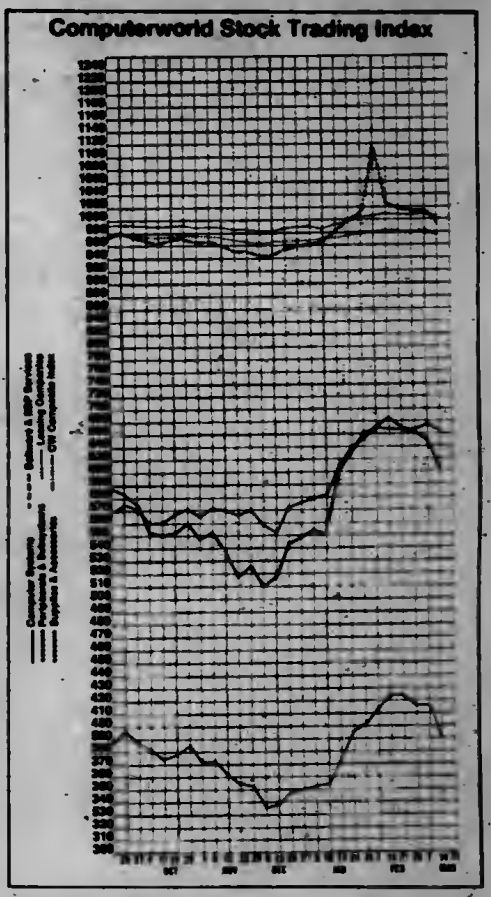
CIRCULATION — Group Vice-President, Margaret Phelan. Circulation Manager, Jane Desberg. Fulfillment Manager, Maureen Burke.

CONFERENCE MGT. GROUP — President, William R. Lerch.

SYSTEMS — Systems Manager, Thomas Pitu.

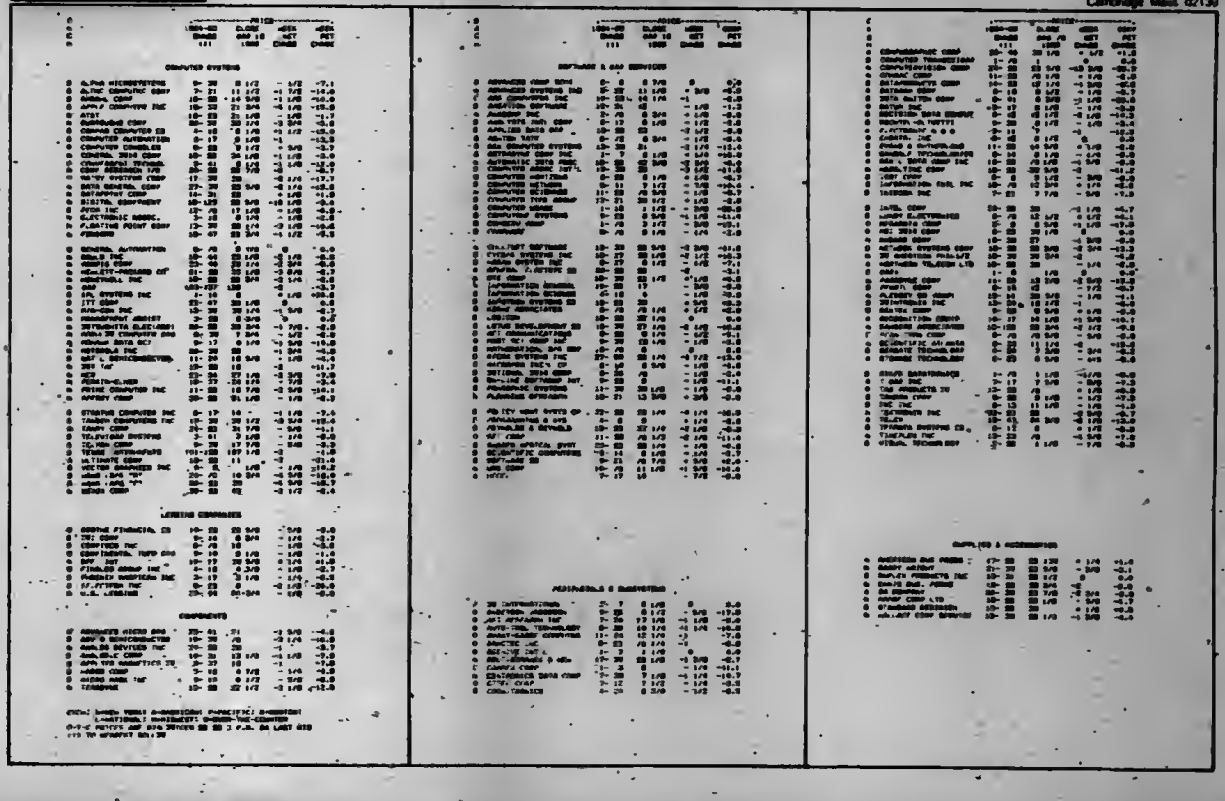
Computerworld can be purchased on 35 mm microfilm through University Microfilms Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed; write to Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE QUOTES INC. Cambridge, Mass. 02139



MSA WE ADD THE GENIUS TO COMPUTERS.™

The Software Company.

MEET THE SYSTEM THAT MAKES BORDERLESS FACT. NOT FANTASY.

INFORMATION EXPERT™

Borderless. ■ You've heard the word enough. And until now, that's all it's been. A word. Not reality. ■ But Management Science America has changed that for good. ■ Introducing Information Expert™ (I.E.). The new mainframe software tool that gives you the level of system integration that some companies have been promising. But not delivering. ■ I.E. is truly borderless. ■ It removes the barriers between systems. Between the individual user and accounts receivable. And accounts payable. And general ledger. And more. So that the individual user can retrieve information and design reports from several application programs at once, even if they aren't all MSA programs. Simply and quickly. At one online terminal. ■ And I.E. is designed to meet the needs of a broad cross section of users. It's easy enough for first-time users—because commands are in plain English. And powerful enough for the most advanced DP specialist. ■ And I.E. also gives you higher levels of security than most other systems. ■ Only MSA gives you I.E. ■ It's a giant technological step into the future from the company that has quietly led the way in application software development. It will now be a part of all software MSA provides. The result of 3½ years of intense research and development, it's the tool that has taken the concept of total "system integration" out of the realm of theory and into the realm of fact. ■ To find out more about I.E., contact Robert Carpenter at (404) 239-2000. ■ Management Science America, Inc., 3445 Peachtree Road, N.E., Atlanta, Georgia 30326. ■ I.E. from MSA. ■ It's one more way we're adding the genius to computers. ■ Today and tomorrow. ■